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OFFICIAL PUBLICATION OF THE CORYNDON MEMORIAL MUSEUM
(MUSEUMS TRUSTEES OF KENYA)

March, 1943 *Vol. XVII* *Nos. 1 & 2 (75 & 76)*

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EDITOR:
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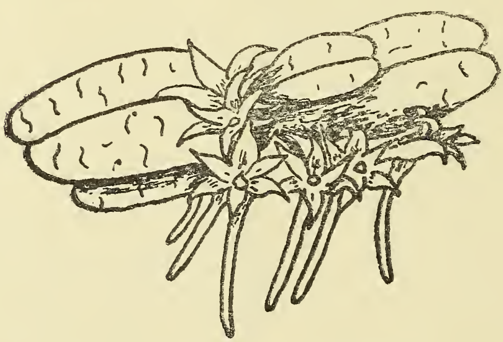
Sphyrarchynchus sp.



Cyrtorchis crassifolia Schltr.

AN INTRODUCTION TO THE EPIPHYTIC ORCHIDS OF EAST AFRICA.

By W. M. Moreau and R. E. Moreau.

Contents.

1. INTRODUCTION.

Over fifteen thousand species of orchids have been described, the vast majority of them tropical, and the greater part of them epiphytic, that is, normally growing on trees without deriving sustenance from them. But little more than ten per cent of the majestic total belong to Tropical Africa and moreover, so far as is known at present, within that area ground orchids predominate over epiphytic in the proportion of more than three to one.

There is reason to believe that these figures are a reflection rather of our ignorance than of the truth. Because the Tropical African epiphytic orchids are not characterised by the magnificence and opulence of those of other regions, they have not attracted the commercial collector and certainly are most imperfectly known. Yet the local orchids display a delightful diversity of adaptation and of form. None are flamboyant, but many are beautiful, some are exquisitely dainty and a few are bizarre. They appeal to the same feelings and are capable of arousing the same enthusiasms as succulents or alpine plants. Moreover, anyone who takes the comparatively little trouble required to collect and grow them has the additional satisfaction of knowing that he is contributing to scientific knowledge.

No general work on African orchids is available, and for our own information we have recently compiled a list of the species authentically recorded within the East African territories, namely, Uganda, Kenya, Tanganyika, Nyasaland, Northern

Rhodesia, and the Zanzibar Protectorate.* Eliminating synonyms, the total for the whole area of roughly one million square miles is only 710 species, of which 209 are epiphytic. It is some indication of how much remains to be discovered that within two years we have collected, with much most generous help from friends, and have been able to maintain alive, about 270 different epiphytic species, most of them from the fifty thousand square miles of north-eastern Tanganyika Territory. While this area is perhaps geographically more favourable than any other, comparable results are to be expected from elsewhere, especially the Mount Kenya-Jombeni area and the Uluguru-Usagara. Unfortunately identification by specialists and description of new species cannot be hoped for until after the war.

Species appear to be localized to a high degree, especially on the isolated mountain blocks of ancient crystalline rock that still carry forest, so that every one of these merits exploration and is likely to yield something new. The indications are, for example, that the epiphytic orchids of the Usambara Mountains are 75% different from those of the Nguru Mountains, ecologically very similar and only 100 miles away to the south-west. The same degree of difference apparently holds good between Usambara and Kilimanjaro, which is, of course, volcanic, 150 miles to the north-north-west.

Nothing could show more forcibly the amount of exploration waiting to be done, than that, after collating all the published records and adding unpublished, the numbers of epiphytic orchids that can be listed for each of the great East African mountains are only: Ruwenzori, 17; Elgon, 19; Kenya, 5; Kilimanjaro, 10. (More than half of these belong to the genus *Polystachya.*) These figures may be compared with the 32 recorded in literature for the Usambara Mountains and the fact that we now know this to be less than one-quarter of the true total.

We have undertaken the compilation of this article with a diffidence appropriate to the fact that we know others in East Africa have been studying the subject for longer than ourselves. But we have been encouraged to proceed by the peculiar advantages of our situation, access to the excellent botanical library at Amani, the generous personal assistance of Mr. P. J. Greenway, and the abundance of our local orchid flora. We are indebted to Dr. W. J. Eggeling and Mr. J. Glover, as well as Mr. Greenway, for reading and discussing our draft from their several points of view, and to Mr. G. R. Cunningham van Someren for criticizing the key.

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*The "British East Africa" of the *Flora of Tropical Africa* includes the Niam-niam country, now part of the north-east Belgian Congo and not within our purview.

2. NOMENCLATURE AND CLASSIFICATION.

Scientific nomenclators are so often thought to move in a mysterious way, with irritating and perverse results, that a brief indication of the principles of botanical nomenclature may assist those who are not systematic botanists.

Each species bears a generic, followed by a specific, name, to which in a formal citation we suffix the name of the person who first gave the plant that specific name. For a name to be "good", that is, acceptable by subsequent workers, it must comply with two requirements:—

(*a*) When first published it must have been accompanied by an adequate description. Otherwise it is stigmatized as a *nomen nudum* and is worthless.

(*b*) The name must not be "pre-occupied", i.e., the same combination of generic and specific names must not have been given already, in due form, to a different kind of plant. This difficulty of "pre-occupied" names arises not only from a describer's overlooking earlier work, but also when a plant is transferred to another genus. In such a case of "pre-occupation", and in no other circumstances, the specific, as distinct from the generic, name can legitimately be changed.

When a plant described under name A is demonstrated to be identical with a plant described at an earlier date under name B, name A is stated to be a synonym of name B and should no longer be used.

So far botanists and zoologists use the same conventions. Now for the differences:—

(i) It often happens that a later worker does not agree with the original describer in his allocation of a particular plant to a particular genus. If he transfers it to another genus he must retain the original specific name and publish the "new combination" ("*comb. nov.*"). Thereafter the first author's name is retained, but in brackets, and followed by the second author's. Thus the plant originally described by Rolfe as *Angraecum floribundum* is now known as *Aerangis floribunda* (Rolfe) Summerhayes. Such full citations will be given in the list of species below, but in the text the authors' names will, for convenience, be omitted.

(ii) Under the international rules of botanical nomenclature specific names derived from personal names, and certain others also, are recommended to be spelt with a capital. That such a refinement is unnecessary is shown by the

fact that zoologists have felt no need for it. It certainly is a great nuisance to amateur botanists and in copying. The Imperial Forestry Institute check-lists have given a lead in ignoring this tiresome convention. Since we have no botanical reputation to lose we thankfully follow them.

(iii) In botany the term "variety" ("var.") is used much more often than "subspecies", and for either the author should be cited as well as the author of the specific name.

Owing to the great changes that have been found desirable in the classification of the orchids in the last fifty years, bracketed names of authors are exceedingly numerous in the East African epiphytics. When the *Flora of Tropical Africa* was written, apart from the genera *Oberonia, Ancistrochilus, Polystachya, Bulbophyllum* (with *Megaclinium*), *Ansellia,* and *Saccolabium* (now *Acampe*), the whole of the rest of the epiphytics, which are collectively known as "the Angraecoids", were included in the genera *Angraecum, Listrostachys,* and *Mystacidium.* With the increasing number of known orchids, however, these genera had been forced to take a wide range of forms not contemplated by their original authors many years before. Their limits had become so vague that species were bandied about between the three genera by successive authors in a bewildering way. When finally Schlechter undertook the revision of the Angraecoids he was faced with the alternative of "lumping" them all in one genus, which would have been most unwieldy, or of dividing them into many more than three genera, some of which would inevitably tend to intergrade. He chose the latter alternative and his system of 32 genera (*Beihefte Botanisches Centralblatt,* Bd. 36(2), 62-181, 1918) has been generally accepted. His conclusions, and the "new combinations" made necessary by the transfer of so many species to new genera, were made more generally accessible by a translation in the *Kew Bulletin* for 1926 (pp. 323-337). So far as East Africa is concerned, few species remain in the genus *Angraecum,* and the genera *Listrostachys* and *Mystacidium* practically disappear. Unfortunately, although Schlechter's genera form fairly natural groupings on general characters, the criteria he designated are mostly minute details of the anatomy of the flower, and his key and other formal keys based on his classification are correspondingly difficult for the amateur to work. In the key we give on page 15 below we have sought only characters obvious to the naked eye: its admitted imperfection is in part due to its convenient criteria.

3. GENERAL ECOLOGY.

While all orchids are perennial herbs, of relatively very slow growth, there is a fundamental difference in mode of development between, on the one hand, *Acampe* and the Angraecoids, and on the other hand plants of the genera *Ancistrochilus*, *Polystachya*, *Stolzia*, *Bulbophyllum*, *Cirrhopetalum*, and *Ansellia*. The former group is monopodial, that is, the growth of the main stem continues indefinitely, by a terminal bud, any lateral branches remaining subsidiary. Growth is usually interrupted seasonally, but not with wholesale shedding of leaves. By contrast the *Polystachya* group is sympodial, that is, the growth of each shoot is completely terminated, with loss of leaves, after one or two seasons. The plant as a whole remains alive, however, periodically making a fresh start by the emergence of a new shoot from the base of an old one. In some species, especially of *Bulbophyllum*, a horizontal runner connects successive shoots; in others, especially of *Polystachya*, the bases of the shoots are agglomerated.

In most of our epiphytic orchids sympodial growth is accompanied by the formation of thickened stems, called pseudobulbs, which provide reservoirs of plant food for subsequent seasons to draw upon. In the dormant stage, the leafless pseudobulbs of some species are covered with dead brown sheaths and present a particularly depressing and hopeless appearance. In some Polystachyas this effect is heightened by the long dried-up spikes emerging from the pseudobulbs: but out of them, when all seems lost, flowers burst without warning. In its extreme form, e.g., in *Bulbophyllum*, the pseudobulb is developed from a single internode of the stem into a tetrahedron or almost a cube, with accentuated angles. In other species pseudobulbs are nearly hemispherical or cylindrical, the vestiges of two or more nodes still being visible. In *Ansellia* and in some species of *Polystachya* the stem is merely thickened into something like a spindle-shape, the nodes remaining well apart. From the tips of all the pseudobulbous stems leaves arise, but usually no more than one or two on each.

The high gloss on the surface of so many pseudobulbs is not an accidental feature. From microscopic examination it appears that the shine is due to a layer of wax, which would not only seal the surface against loss of water by transpiration but also hinder the invasion of the tissues by harmful micro-organisms. Both these means increase the efficiency and longevity of the pseudobulbs as storage organs. Their powers of survival are illustrated by a leafless stem of *Ansellia*, one end of which we have kept bound in moss and occasionally watered for nearly two years: it shows no signs of rooting but is as firm and sound as the day it came off the parent plant.

The roots of mature orchids, which in most epiphytic species are thickened into a blunt process shaped like an earthworm, differ from those of most plants in being devoid of assimilating root-hairs. It has been thought that their function is performed by a minute fungus (mycorrhiza) carried on the external cells of the root. Some doubt has been cast on this opinion, but it is certain that an orchid seed cannot develop unless the embryo is infected with its correct mycorrhiza. When a root is actively growing its tip is brightly coloured, often pea-green or raw-sienna, shiny, and mucilaginous when wet. In that state the root is capable of adhering very closely to its host, or even pushing under the outer layers of bark; but if once detached or damaged that sensitive tip seems incapable of adhering again and a fresh start is often made by a side-branch of the root. A fraction of an inch behind the tip the living colour and texture change abruptly to the dull opaqueness of cortical cells, usually, in exposed roots, more or less grey-green. These cells form a thick spongy envelope, the "velamen", capable of absorbing and storing moisture for the "true" root, tough and thread-like, that runs through their midst. A peculiarity of the root-system of many epiphytic orchids is that as the stem elongates new roots are thrust out at intervals among the leaves.

Since the roots merely adhere to their support without drawing anything from its surface—and indeed some species have a large proportion of their total root-surface entirely aerial and can live with no adhesion at all—it is a matter of endless wonder to us that they should be able to secure the nutrients necessary for even their slow rate of growth. Some species, it is true, evidently prefer hollows and mossy surfaces where there is some accumulation of humus, however slight. But *Acampe*, for example, seeks no such advantage, and yet in the course of years builds up an appreciable weight of tissue. In general, it seems that for epiphytic orchids nutrients may be in part directly air-borne, e.g., pollen, comminuted plant débris, mineral dust and bird-droppings, trapped in the convolutions of the roots, in part water-borne, transported by rain along the surface of the host and including the breakdown products of that surface. The mineral elements required for growth would seem to be the hardest to come by; especially in rain-forest, where epiphytic orchids are more plentiful than anywhere else, accretions of air-borne inorganic matter must be altogether smaller than in dusty regions.

Plants of epiphytic species may on rare occasions grow in soil (or on rocks) and ground orchids may find sufficient humus in a tree hollow, but on the whole the division between epiphytic and ground orchids is clear-cut. Each genus of East African orchids falls in its entirety into one category or the other except that an abnormal group in *Liparis* is epiphytic and the species

forming a small section of *Polystachya* are typically terrestrial. Certain Angraecums, including *A. infundibulare* and *A. giryamae* seem to occupy a somewhat intermediate position, capable of living without ground connection but doing better with it. The Vanillas more certainly originate in soil, though they may live independently later, and they are not regarded as epiphytics for the present purpose.

There can be very few epiphytic orchids in East Africa, that are not faced from time to time with periods of at least a month when no rain falls. In some areas, indeed, like much of Southern Tanganyika, an unbroken drought of five months each year can be counted upon. The full effects of such periods are doubtless to some extent mitigated by what has been called "occult precipitation", from mist and dew. Especially where the orchids are growing amongst loose moss or beard-lichen in situations such as scarp-edges, the amount of moisture so condensed and made available to the absorbent root-envelope is astonishingly high. It will often be found that on a wooded hillside in dry country, or in a grove of trees, epiphytic orchids are very narrowly localized indeed, and the probable cause is that the favoured site has a slight advantage of cold-air drainage from above or of sharply cooled up-current from below.

For economizing the moisture they can secure, our epiphytic orchids have several expedients, often in combination. For one thing, most of them have leathery or succulent leaves; and even those are shed periodically in many species. The most drastic device is to dispense entirely with leaves at all seasons, as the *Gussonea* species do. Others have reduced their leaf-surface very greatly, either by retaining few and small narrow leaves, as in *Rhipidoglossum xanthopollinium* and *Aerangis graminifolia,* or reducing them to mere needles, as in some species of *Tridactyle.* The pseudobulb system, too, is effective against seasonal drought, especially in those species in which all leaves are shed. Some plants grow in such a form as to entrap moisture: this applies especially to certain of the leafless species the roots of which, instead of spreading, as in *Gussonea chilochistae* or *G. megalorrhiza,* form a densely interwoven mass. The most notable device of this kind has been perfected by *Ansellia,* the "Leopard Orchid", which forms a clump, weighing ultimately many pounds, in situations that are usually hot and subject to long droughts with desiccating winds. An *Ansellia* seedling first of all puts down roots that adhere closely to the bark of the host tree in the ordinary way. Once anchorage is secured, each season's growth consists of a forest of slender roots all thrusting vertically upwards. Each dies after a few inches growth, but the woody remains persist, so that in the course of years a great fibrous mass is formed, the constituents of which are so directed as to trap the maximum of rain.

Their tough tissues and their various adaptations for water economy give most epiphytic orchids an astonishing power of survival. Kept dry, they stand transport well and they can be moved at the beginning of their flowering, which would in most plants be a highly vulnerable time, without suffering and with hardly a check in the development of their flowers—a striking testimony to the powerful buffer effect of their storage organs.

Most epiphytic species have a rather restricted range of altitude. Subject to further information it seems to us that as a rule a species is more or less confined to one of the zones that may be designated Highland, Intermediate and Lowland, the lower limits of the first two being in most areas about 5,500 ft. and 3,000 ft. respectively, but lower near the coast. Species are fewest in the Lowland Zone, even in rain-forest. A few, e.g., *Acampe*, are very strictly Lowland, and two of these, *Tridactyle wakefieldii* and *Angraecum dives*, are usually close to the sea. On the whole, epiphytic orchids seem most plentiful, in both individuals and species, between about 3,000 ft. and 5,000 ft. in rain-forest. It is very noteworthy how rare they are in forests dependent upon ground-water, such as the Rau at Moshi. On the other hand, at Amani (at 3,000 ft. in Usambara and with a rainfall of 80 ins.) a dozen or more species can be collected from the crown of a single fallen forest tree. Above 5,000 ft. in Usambara, species become less numerous again, with the genus *Polystachya* predominating.

From the fact that they grow on trees, practically all epiphytic orchids receive some shade, at any rate during their active season. No species, however, are commonly found in the ground- and mid-stratum of really tall dense rain-forest. In such a place the abundant orchids all occupy the canopy or the outside edges of the forest: but in poor and more open forest, especially at high altitudes, epiphytics may be found near the ground.

There is little evidence of specific relation between orchid and tree-host; except that certain aberrant Polystachyas that are otherwise terrestrial also grow on the curiously fibrous stems of Vellozias, but on no other host. In general, rough bark is naturally more favoured than smooth and it is remarkable how very rarely an orchid is found on any fig-tree (*Ficus* sp.). On the other hand, given a favourable climate, many orchids colonize exotic trees, e.g., camphor (*Cinnamomum camphora*) and conifers, such as *Juniperus bermudiana*, with surprising enthusiasm. A few small species, e.g., *Angraecum viride*, are found always on twigs rather than branches. Somewhat contrary to expectation, orchids do not occur in association with the coarse epiphytic ferns *Asplenium nidus* and *Dryopteris laurentii*, which would seem to offer favourable foothold; but orchids often have their roots closely interwoven with those of

smaller ferns and naturally are often more or less embedded in moss and lichens. A few species bear specific names, e.g., *muscicola* (inhabiting moss), *rhipsalisocia* (living with *Rhipsalis*), that indicate associations of this nature; but the original field-notes on which the names were based were probably casual and not really significant.

4. THE ORCHID FLOWER.

In most familiar garden flowers the petals provide the showy part and the sepals are entirely subordinated, forming an inconspicuous green calyx. In the Orchidaceae this does not hold good. The flower consists of three petals so arranged inside three sepals that if all were pointed and of equal length they would form a regular six-pointed star, sepal alternating with petal, as is practically achieved in some *Cyrtorchis* species. In general, the sepals are at least as conspicuous as the petals.

As the unopened flower lies in its sheathing bract, that part pressed against the main flowering stem (rhachis) is the "odd petal", "lip" or "labellum", and in the opened flower the part directly opposite to this is the so-called dorsal sepal. In the various genera of the Orchidaceae the shapes and the relative proportions of the sepals and petals are subject to infinite and fantastic variation, but the lip undergoes the most astonishing development of all. In the orchids that have been commercialized it is often the most conspicuous part of the flower, its biological justification being that it is the alighting board for insects and besides often bears direction-marks to the nectary. As it happens, the East African epiphytics include among them no species with flamboyant lip, except *Ancistrochilus;* but the surface may be adorned with ridges and cushions as in *Polystachya,* or it is stiff, fleshy, repeatedly curved and delicately hinged, so that a touch sets it moving (as in *Bulbophyllum*). In some genera, as *Angraecopsis,* the lip is deeply cut into three lobes, while in *Tridactyle* it is often also fringed.

In our monopodial orchids the nectary at the base of the lip is progressively developed, in the first stage into a slight external bulge (*Acampe*), next into a cone (*Bolusiella*) or a bubble-like sac (e.g., *Gussonea chilochistae*), then into a conspicuous tapered spur (as *Cyrtorchis*) and finally into a thread-like appendage several inches long, not all of it holding nectar (as in *Aerangis*).

The other two petals are simple compared with the lip, usually smaller than the sepals, and sometimes greatly reduced. Among the epiphytics the most curious modification is in a *Bulbophyllum* (obviously allied to *B. tentaculigerum* of West Africa), where each petal looks exactly like the clubbed antenna

of a butterfly, the resemblance being heightened by the erect way in which they are carried.

The dorsal sepal is always comparatively simple, but the laterals show some interesting modifications. In *Polystachya*, their lower edges are bent forwards and inwards until the basal parts unite: the result is the "hood", so characteristic of the genus, with the lip, which, it will be remembered, is the odd petal, sheltered within it. In *Cirrhopetalum* the lateral sepals are elongated and brought forward so that the *terminal* two-thirds of their lower edges is fused, but a gap is left at the base.

In all the African Orchidaceae the anthers-cum-filaments and stigmas-cum-styles of more familiar flowers are represented by only a single one of each and, moreover, they are fused together to form a comparatively stout column rising immediately above the nectary. The anther element, capped with a lid (operculum) liable to fly off at a touch, forms the highest part of the column. Immediately under the lid are the pollinia, minute membranous bags of pollen-grains. The surface on which they lie, which is practically the top of the column, is in many species produced in front, in its simplest form into a little shelf, in others into a complicated projection, called the rostellum, which serves to keep the pollinia from dropping on to the stigma below. The pollinia are connected, usually by exceedingly slender threads (stipites) to the viscidium, an easily detachable sticky patch designed to adhere to an insect visiting the nectary and to be carried away, complete with pollinia. The stigmatic surface, so arranged as to receive and retain transplanted pollinia, is lower down the column, and, as in other flowers, is in direct communication with the ovary, which is immediately below the junction of the foot of the column with the bases of the petals and sepals. The ovary merges into the pedicel, the little stalk supporting the individual flower. After fertilization this swells into a capsule, often of a size surprisingly large for its flower, and containing thousands, or hundreds of thousands, of very minute seeds.

In considering the general anatomy of an orchid flower it is necessary to bear in mind that the flower may have twisted on its pedicel or, botanically speaking, that "resupination has taken place". In all orchids, so long as the flower is completely enclosed in its sheathing bract, the lip and spur (if any) are pressed against the rhachis (the main stalk of the flower spray) with the spur pointing towards the base of the rhachis. If the pedicel merely pivoted outwards as it cleared the bract, the flower when it opened would have its lip on the side nearest the tip of the rhachis, that is, on an upright rhachis, uppermost in relation to the ground. This is what happens in the *Polystachyas*. But in many orchids as the flower emerges from the bract its pedicel not only lengthens but twists, so that eventually

the lip and spur point towards the base of the rhachis, that is, in an erect flower-spray, downwards. In *Angraecum giryamae* the twisting may be well seen in every stage and a record of the movements is preserved in the contorted lines of the individual pedicel. The latter, when the flower eventually opens after turning through more than 300 degrees, is wrapped round the base of the spur in what looks like a strangle-hold. The whole phenomenon was discussed by the late Sir Arthur Hill in *Ann. Bot.* (N.S.), Vol. 3, pp. 871-887, 1939. The usual explanation of resupination is that as a result the flower is so arranged that a visiting insect finds a convenient landing place, on the lip. But the Polystachyas succeed without bringing the lip to the lower side of the flower and *Angraecum giryamae* in its contortions passes through that position and by the time it opens is well beyond it.

Scent.

Most of the East African epiphytic orchids have a smell, but practically nothing is recorded on the subject. The smell is provided by aromatic oils in the superficial cells of the petals and sepals. It appears that the active substance may be derived from an inert compound, such as a glucoside, from which the fragrant oil is gradually developed by the action of an enzyme (ferment) when the flower is open. Vanillin is understood to be the basis of many orchid scents, and this would account for the fact that almost identical scents are possessed by highly dissimilar flowers. For example, both *Rhipidoglossum rutilum* and a *Polystachya* have a sweet heavy smell of the richest vanilla-flavoured chocolate; *Polystachya imbricata* and several other species resemble bay-rum. There are, however, a great number of delicate variations, for example:—

Acampe mombasensis and *A. pachyglossa*: hyacinth.
Polystachya near *P. cultriformis:* primrose.
Aerangis kotschyana: narcissus.
Aerangis sp.: mignonette.
Tridactyle sp.: woodruff (new-mown hay).
Cyrtorchis spp.: sun-warmed gorse.

A few specific names refer to the scent: we have *Polystachya odorata* and *Chamaeangis odoratissima,* but these are not pre-eminent in their genera. *Bulbophyllum cocoinum* is said to be so-called because the scent is like that of coconut milk: but Amani specimens of the species strike us as merely faintly sweet. Local variation is a factor to reckon with in any attempt to define scents.

It will be found that many orchids have a scent-rhythm with time of day. Thus, while the *Cyrtorchis* spp. for the most part are sweet-scented throughout the twenty-four hours, the *Aerangis* spp. give out their perfume wholly or most strongly

at night. Certain *Diaphananthe* and *Angraecum* spp. are quite odourless until dusk, while *Angraecum viride,* for example, is diurnal. In Ceylon, certain orchids are known to change the nature of their scent with the hour of the day, but this has yet to be demonstrated for any East African species.

A minority of the local epiphytic orchids have a definitely unpleasant smell. *Polystachya polychaete* and *Diaphananthe kirkii,* for example, have a sickly fermented sweetish smell. Certain Bulbophyllums stink like carrion, and it is noteworthy that, as in the Stapelieae, such foul smells are linked with dull purple coloration.

It may be assumed that the function of the various orchid smells is to attract the visits of pollinating insects. Power of scent is not, however, in inverse proportion to degree of conspicuousness. The big *Cyrtorchis* spp., with masses of white flowers, are as fragrant as any, while the tiny *Bolusiella* spp. and the little green *Angraecum dives* flowers seem to us practically without scent at all hours. Presumably the sweet scents attract mainly Lepidoptera, and we have observed that the bad ones attract Diptera: but nothing is recorded of the specific relations of plants and insects in East Africa. Special attention may, however, be drawn to the fact that the magnificent *Angraecum* (*Macroplectron*) *sesquipedale,* with its 15-inch spur, was recorded by Engler (1895) from the East African coast. The existence of this orchid in Madagascar led Darwin to predict that a moth would be discovered with proboscis longer than any known in the island and capable of reaching the nectary. This was realised many years later in the person of the giant hawk-moth, *Xanthopan morgani praedictum.*

5. PUBLISHED AND UNPUBLISHED SOURCES.

For all ordinary purposes the literature begins with the *Flora of Tropical Africa,* Vol. 7 (1898), where Rolfe gave descriptions, in English, of all the Tropical African species known up to that date. Since then the great majority of the new species and most of the taxonomic work published have been in successive volumes of the *Kew Bulletin* (especially by Summerhayes since 1927), of *Engler's Botanische Jahrbücher,* and of the *Notizblatt des Botanisches Gartens Berlin.* Schlecter's important work in *Beih. Botan. Centrabl.,* 1918, has already been especially mentioned.

Other works containing numerous records of East African orchids (most of them, however, ground species) are:—

(*a*) Engler's *Die Pflanzenwelt Ost-Afrikas* Teil C (Berlin, 1895). This publication was earlier than that of the *Flora of Tropical Africa,* Vol. 7, but it does not seem

to have been fully utilized in the later work. Engler's is not a very satisfactory source: some of the localities are vaguely stated and, in the light of present knowledge, some of the identifications are doubtful.

(*b*) Rendle's account of the orchids obtained on Ruwenzori and in extreme south-west Uganda by the Anglo-German Boundary Commission (*J. Linn. Soc. Bot.*, Vol. 37, No. 259, pp. 215-223, 1905).

(*c*) Engler's *Pflanzenwelt der Erde,* Vol. 9: *Die Pflanzenwelt Afrikas,* Bd. 2(1) 1908, and Bd. 5(1) Teil 1 (1925). These are compilations, in the first of which the several genera, as then conceived, are dealt with discursively. The other volume, that of 1925, brings together most of the records then known for Kenya, Northern Tanganyika Territory, and Ruwenzori. It contains obvious mistakes.

(*d*) Milbraed's contribution to the flora of Ruwenzori in *Wiss. Ergeb. Deutsch Zentral-Africa-Expedition,* 1907-08, Bd. 2 Botanik Lfg. 1 (Leipzig, 1910).

(*e*) Fries (Rob. E.) in *Wissenschaftliche Ergebnisse der Schwedischen Rhodesia-Congo-Expedition,* 1911-12: Bd. 1. *Botanische Untersuchungen,* Heft 2 (Stockholm, 1916) provides many records for Northern Rhodesia.

(*f*) Chiovenda's *Raccolte botaniche fatte dai Missionari della Consolata nel Kenya* (Modena, 1935) contains a number of records for the mountains of Kenya, but there is some reason to doubt whether the identifications were made after comparing the specimens with authenticated material.

(*g*) Summerhayes in dealing with the Orchidaceae in the *Flora of West Tropical Africa,* Vol. 2, Part 2 (1936) mentions, by territories, those parts of East Africa in which individual West African species occur, but incidentally and not exhaustively.

The publications cited above are, apart from certain systematic works, all those published during the last fifty years that are of importance for a study of the East African orchids: they contain more or less complete descriptions of 98% of the species on the list and nearly as great a proportion of the published local records, though in them the amateur will find very few illustrations to help him. Both Engler's book of 1908 and the *Flora of West Tropical Africa* provide, however, a drawing of one or more selected species, not necessarily East African, of some of the more important genera.

Especially if one judges solely from the published information on East African orchids, field work on them has been excessively patchy in both time and place. In the Nyasaland Protectorate there have been practically no new records in the

present century. In Northern Rhodesia nearly every record is either from Lake Bangweolo or from within a few miles of the Tanganyika border; and they are mostly due to the collectors before 1900 and to the Swedish expedition of 1911.

In Tanganyika Territory collecting has been more continuous, but extremely localized. From the whole of that huge area, nearly 200,000 square miles, between Kilimanjaro, Lake Victoria, Lake Tanganyika, the Southern Highlands, and the Ulugurus, barely half-a-dozen orchid records have been published. On the other hand much is known about the area immediately north of the head of Lake Nyasa, where in the years prior to 1914, Stolz made the finest collection of African orchids ever described, including 146 new species out of the 207 he obtained. Between his area and extreme north-eastern Tanganyika, hardly any orchids were known until the 1930's, when Schlieben produced some striking novelties from the Ulugurus. In Northern Tanganyika attention was concentrated exclusively on the Usambara Mountains and Kilimanjaro, where one collector after another has worked; but we are in a position to say that they discovered only a fraction of the epiphytic species even in those localities.

In Kenya Colony extremely few orchids had been recorded from anywhere but the neighbourhood of Mombasa right up till 1924, when the account appeared of the Fries collection made in 1922, on Mount Kenya, Elgon and the Aberdares (*Notizbl.*, Vol. 9, pp. 16-22). Since then there have been several additions to the knowledge of those mountains, especially Elgon, but to this day there seems to be not a single record of either ground or epiphytic orchid on the coast anywhere north of Mombasa, or in the Northern Frontier Province; while the published records for Central and Western Kenya, including such familiar areas as Nairobi, Ngong, Mau, Sotik, hardly reach one dozen. In Uganda, the great majority of the early records came from Ruwenzori and the south-west. Latterly collecting has been much better distributed, but many of the published records are not localized, being represented merely by "Uganda" in the *Flora of West Tropical Africa*.

In the check-list that follows, we have been able to supplement the published records to an important extent from lists of unpublished Kew identifications most kindly put at our disposal by a number of correspondents. The sources of the unpublished records are indicated in the check-list by initials, as follows:—

AH=Amani Herbarium.
BDB=Herbarium of the late Mr. B. D. Burtt, communicated by Dr. C. H. N. Jackson.
CMH=Coryndon Museum Herbarium, comm. Mr. P. R. O. Bally.

ILLUSTRATIONS.

All except diagrams 12—15 on Plate 1 are natural size.

The drawings facing page 1 illustrate *Sphyrarhynchus* sp. (above) and *Cyrtorchis crassifolia* Schltr. (below).

EXPLANATIONS OF PLATE 1.

Angraecum giryamae Rendle, parts (natural size).

1. Rhachis
2. Dorsal sepal.
3. Petal
4. Lateral sepal.
5. Lip (or labellum), upper side
6. Under side of lip with spur (containing nectary).
7. Column.
8. Pedicel containing ovary (twisted by resupination).
9. Bract.
10. Twisted pedicel in relation to spur and rhachis (resupination).
11. Disc or cushion.

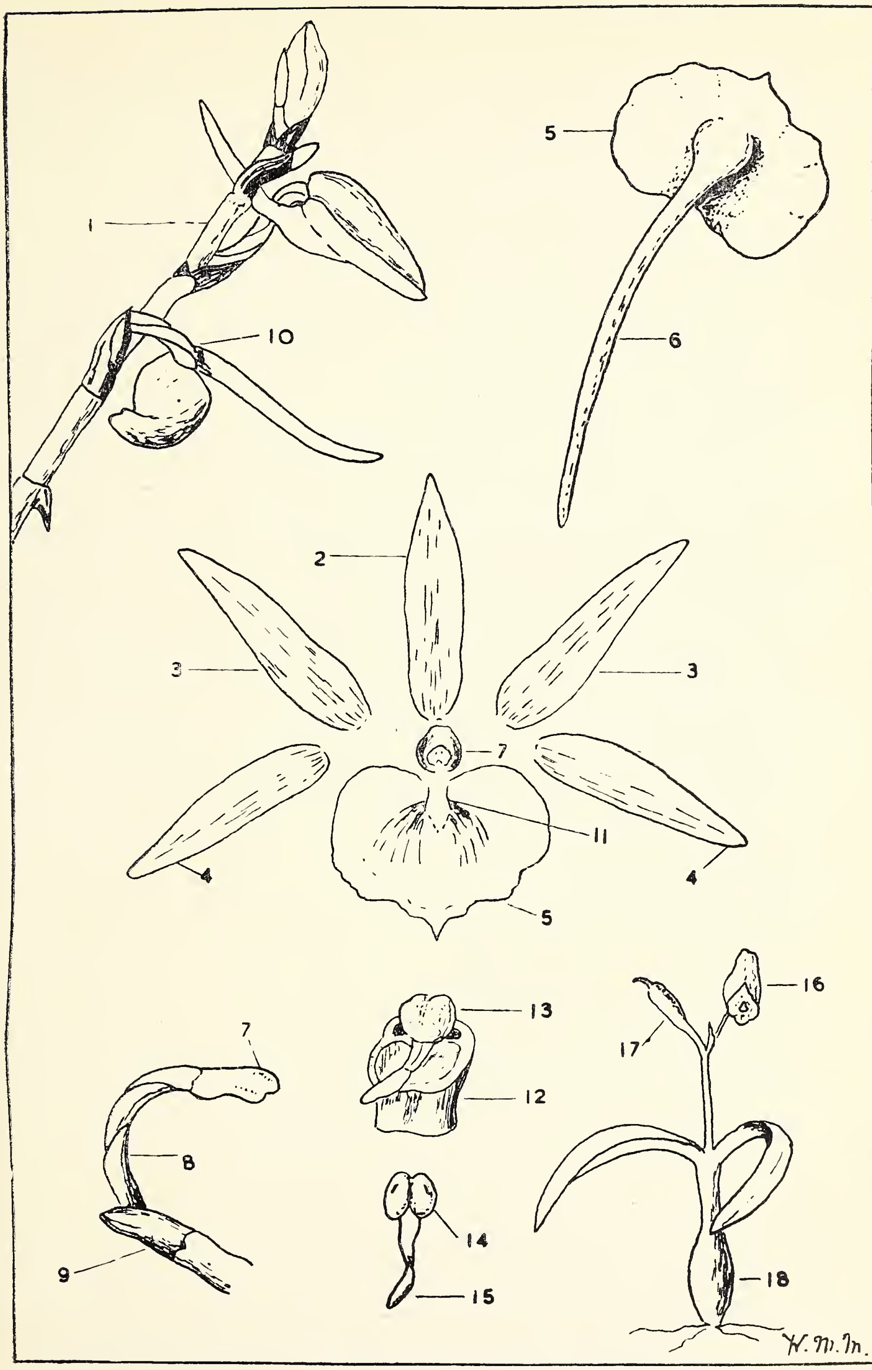
Aerangis kotschyana (Rchb.f.) Schltr., parts (enlarged).

12. Column entire, with rostellum and pollinia superimposed.
13. Operculum or lid covering (and hiding) pollinia.
14. Pollinia, connected by their stipites (singular "stipes") with:—
15. Viscidium.

Polystachya ottoniana var. *confusa* (Rolfe) Krzl.
(natural size).

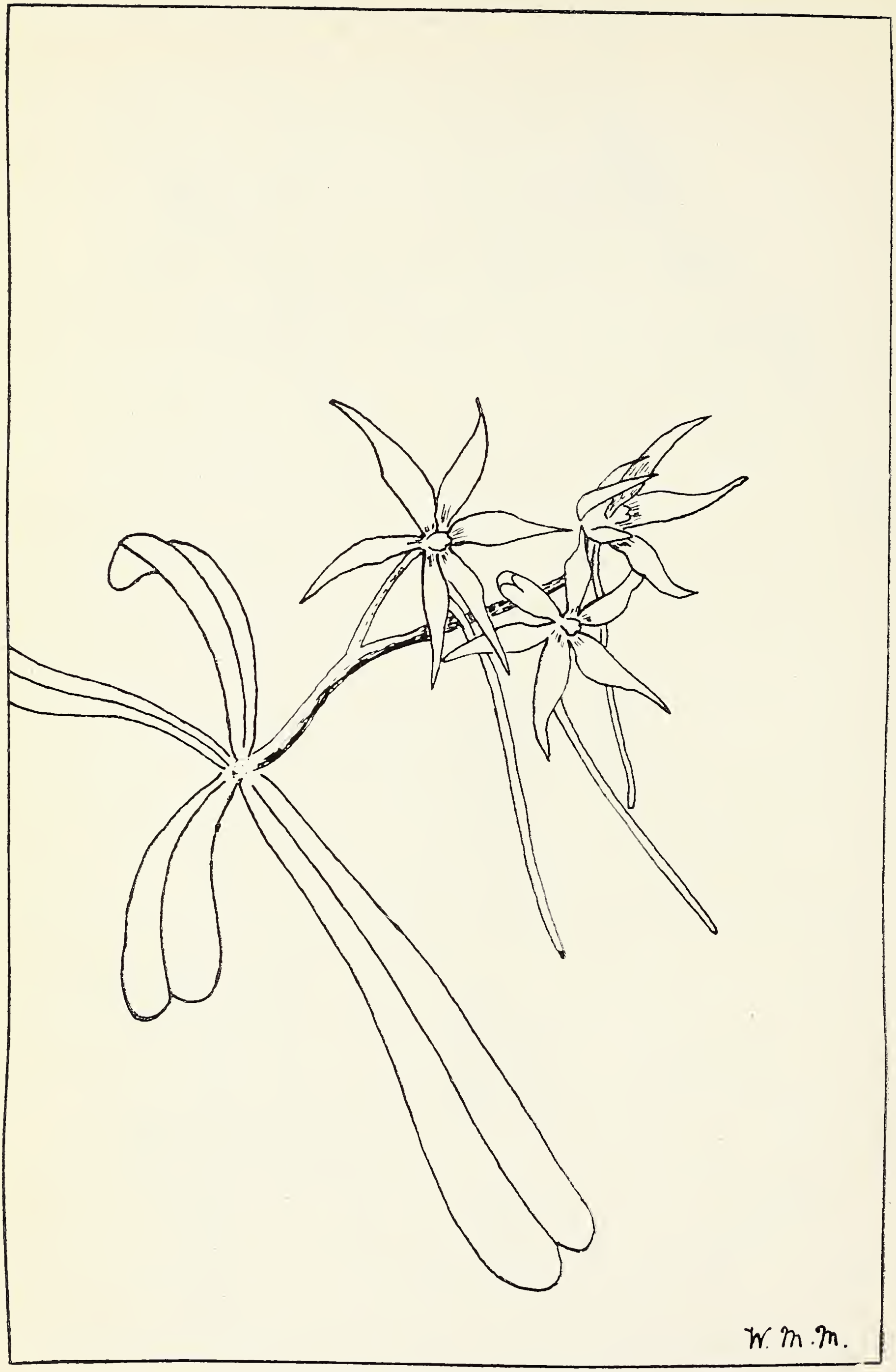
16. Hood formed by the junction of the lateral sepals, which are not on the lower side of the flower as they are in *Angraecum giryamae*, but on the upper.
17. Seed capsule.
18. Pseudobulb—thickened base of stem.

PLATE 1.



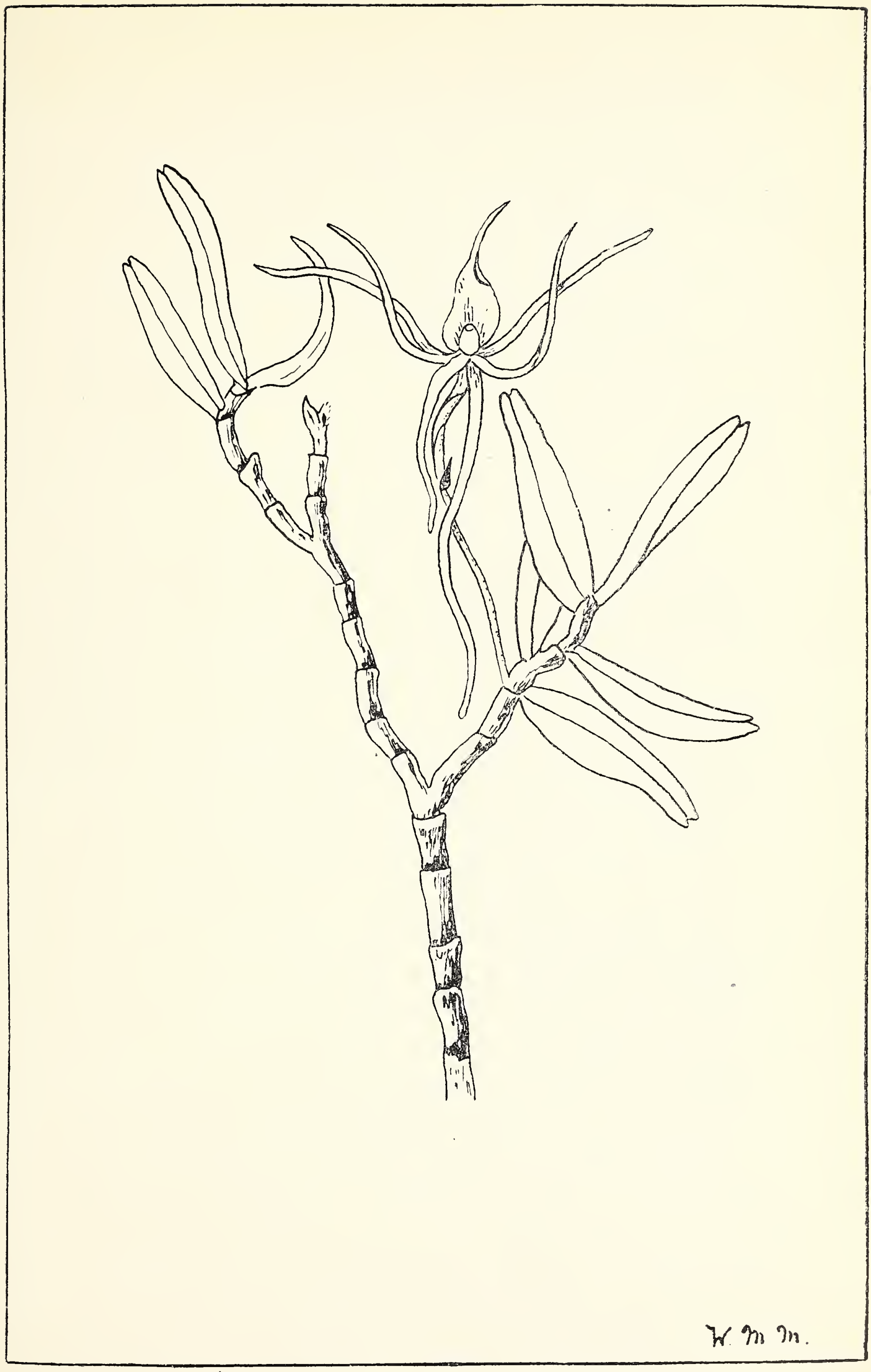
Diagrams illustrating parts of flower, etc.

PLATE 2.



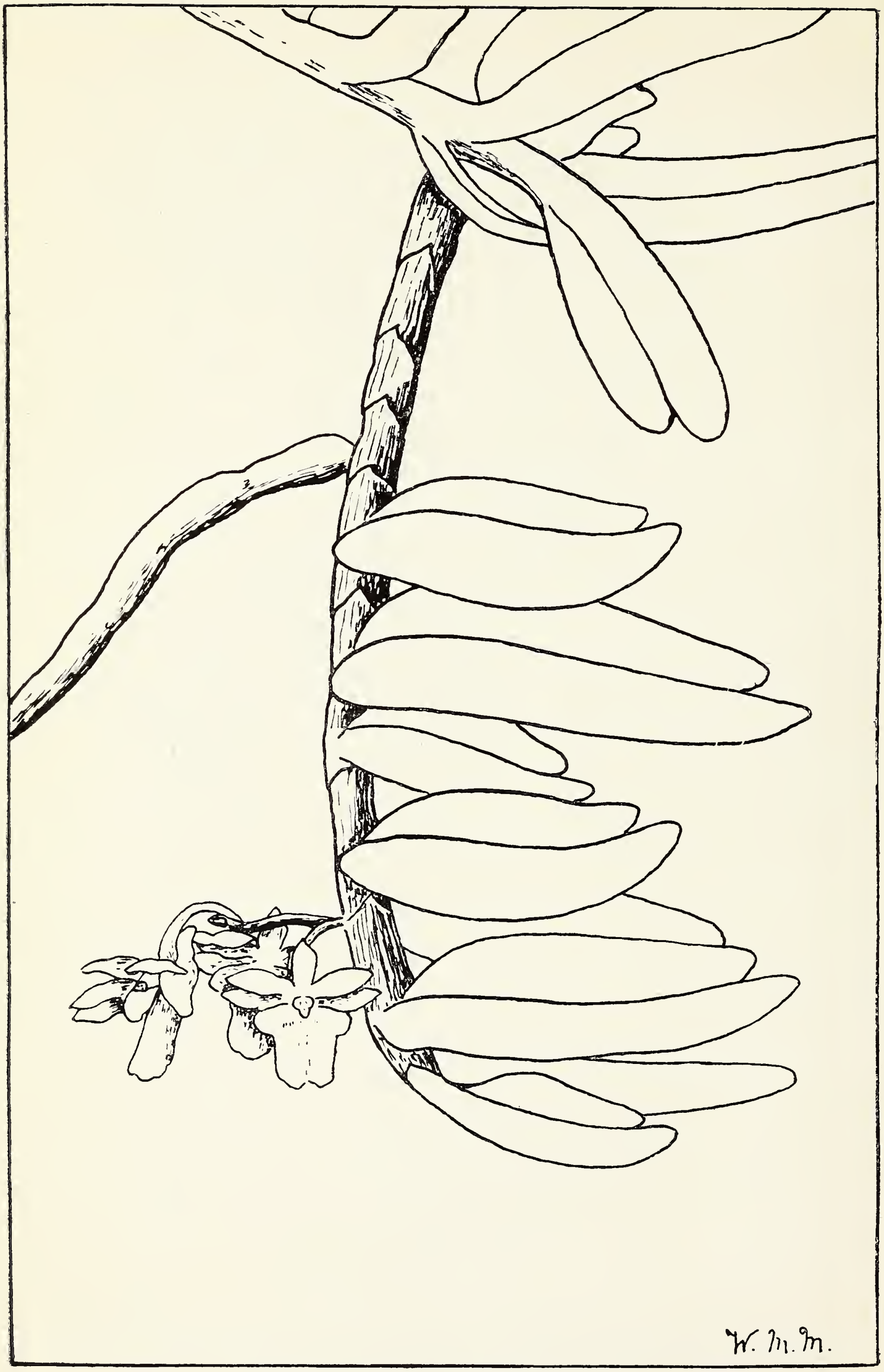
Aerangis kirkii (Rolfe) Schltr.

PLATE 3.



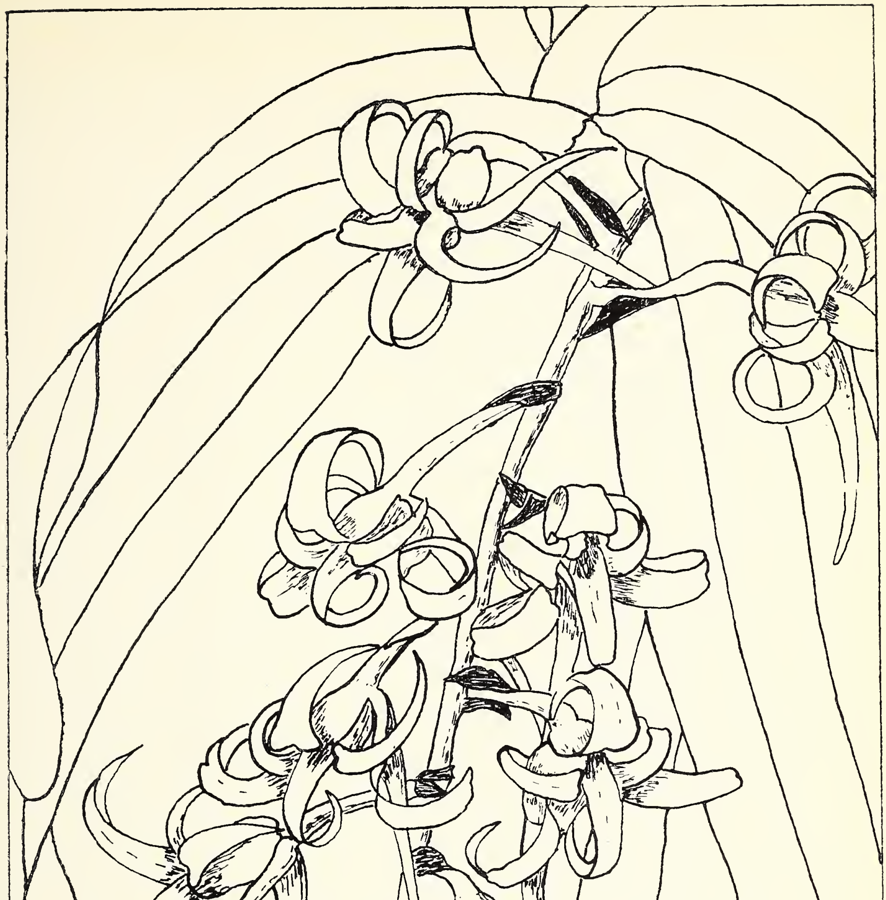
Angraecum verrucosum Rendle.

PLATE 4.



Calyptrochilum orientale Schltr.

PLATE 5.



Cyrtorchis sp.

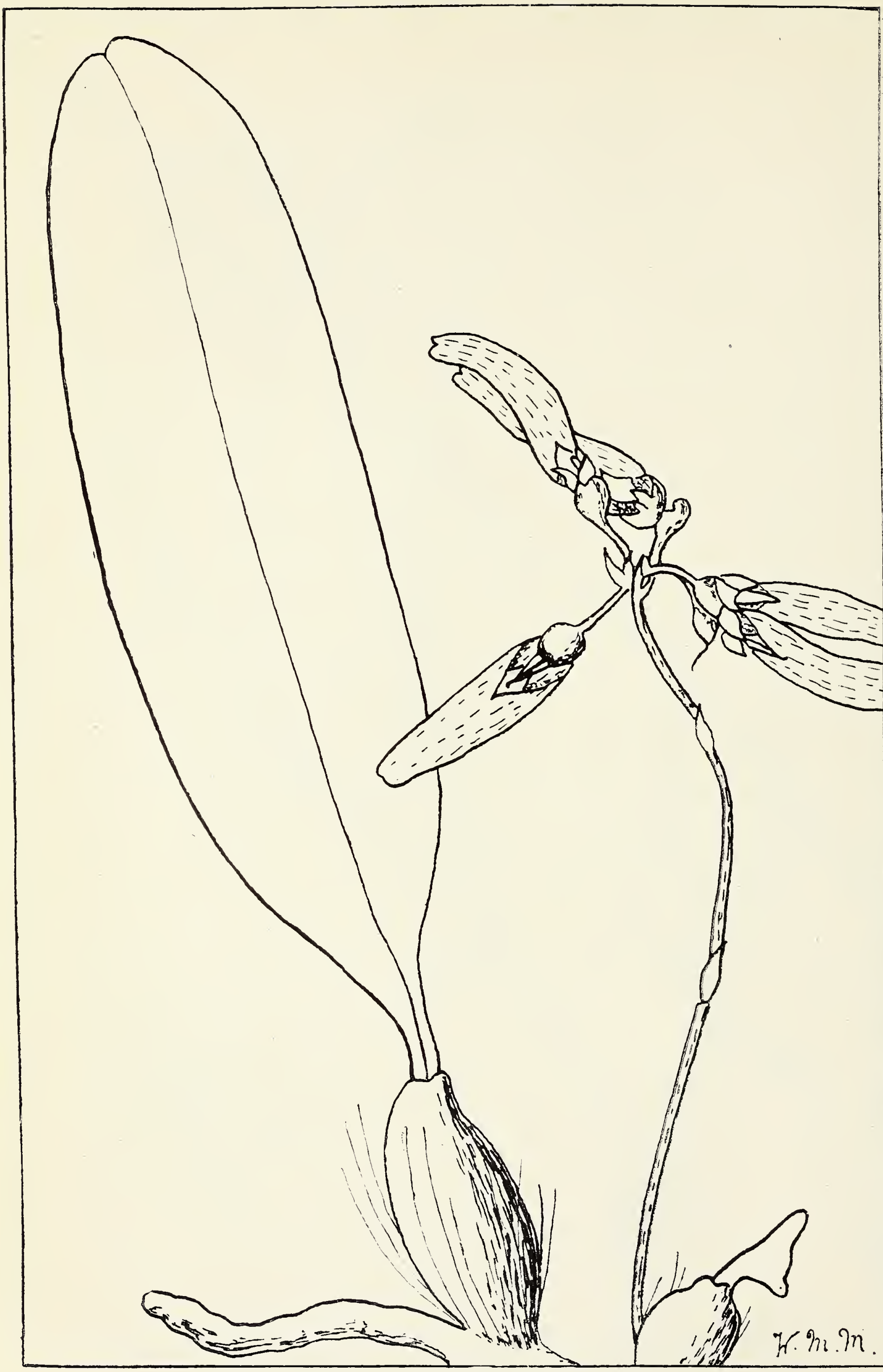
PLATE 6.

Tridactyle teretifolia Schltr.

PLATE 7.

Bulbophyllum platyrhachis (Rolfe) Summerh.

PLATE 8.



Cirrhopetalum africanum Schltr.

CS=Coll. Mr. G. R. Cunningham van Someren, personally comm.

EBC=Miss E. Bruce collection, comm. Mr. A. D. Cotton, Kew.

GBW=Coll. Dr. G. B. Wallace, personally comm.

KFH=Kenya Forest Department Herbarium, comm. Mr. H. M. Gardner.

UAH=Uganda Agricultural Department Herbarium, comm. Mr. A. S. Thomas.

UFH=Uganda Forest Department Herbarium, comm. Dr. W. J. Eggeling.

VH=Herbarium of Lieut.-Col. J. H. Vaughan, personally comm.

Between them the above must include a large proportion of the fully authenticated, but unpublished, records available. We would emphasize that while, of course, a definitive check-list can be achieved only after much more collecting and much more taxonomic work (and only in the distant future) the inclusions in this interim compilation have not been uncritically made. The Uganda data can be taken as especially sound, because they have been sifted independently by Dr. Eggeling. Records, such as our own, for which there has been no chance to obtain Kew verification, are excluded.

6. TENTATIVE FIELD KEY TO THE GENERA.

Of necessity this key is quite unorthodox because it cannot use the microscopic characters that form the theoretical bases of orchid classification. (Incidentally, a certain character used by Schlecter for a primary division of the Angraecoids has already been found unworkable—Summerhayes, *Blumea*, Suppl. 1, 78-87, 1937.)

We cannot emphasize too strongly that this key is intended to cover only those species included in the check-list that follows. It will not necessarily, and in fact cannot hope to, serve to run down into their genera all the other species, hitherto regarded as extra-limital or actually undescribed, that occur in East Africa.

For reasons given in the check-list, *Listrostachys, Mystacidium,* and *Sarcorrhynchus* do not appear in the key and no attempt has been made to separate *Rangaeris* from *Aerangis.*

(1) Perennially devoid of leaves. *Gussonea* (*Microcoelia*). p. 22.
Not as above *see* (2).

(2) Flower very small and green, with column nearly as long and conspicuous as sepal or petal. *Liparis.* p. 28.
Not as above *see* (3).

(3) Flowers very large, yellow and brown, in long showy sprays. *Ansellia*. p. 26.
Not as above *see* (4).

(4) Old stems forming obvious pseudobulbs *see* (5).
No obvious pseudobulbs *see* (7).

(5) Flower stem arising from base of pseudobulb *see* (6).
Flower stem arising from tip of pseudobulb. *Polystachya, Stolzia*. p. 28, 32.

(6) (*a*) Flower large and open; lip purple, with long narrow tip. *Ancistrochilus*. p. 26.
(b) Lateral sepals elongated, joined together towards tip but not at base. *Cirrhopetalum*. p. 27.
(c) Not as (*a*) or (*b*). *Bulbophyllum*. p. 26.

(7) Plant strong and stiff, with short heads of fleshy flowers, yellow-green barred red. *Acampe*. p. 25.
Not as above *see* (8).

(8) Plant greatly compressed; leaves flat, not folded, all arranged in same upright plane and appearing fused at the base *see* (9).
Leaves not as above *see* (11).

(9) Inflorescence arising from tip of plant. *Oberonia*. p. 28.
Inflorescence arising from base of plant *see* (10).

(10) Inflorescence shorter than the leaves but pedicels not very short. *Podangis*. p. 24.
Inflorescence not shorter than leaves but pedicels extremely short. *Bolusiella*. p. 21.

(11) Lip with no rudiment of "spur". *Polystachya*. p. 28.
Lip with "spur", either bubble-like or more pronounced *see* (12).

(12) Inflorescence extremely short, less than one-sixth of leaf *see* (13).
Inflorescence not so short *see* (15).

(13) Inflorescence forming a dense, round bunch of flowers. *Cephalangraecum*. p. 21.
Inflorescence sparser and more elongated *see* (14).

(14) Leaves thick and fleshy. *Cyrtorchis refracta*.* p. 22.
Leaves not fleshy. *Ancistrorrhynchus*. p. 20.

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*A plant very unlike other species of *Cyrtorchis* and in all probability wrongly allocated to that genus.

(15) Lip deeply cleft or with sharply projecting prongs, side-lobes or teeth *see* (16).
Lip simple, or with only rounded or oblong lobes *see* (17).

(16) Lip divided into three nearly to base; flower pure white. *Angraecopsis*. p. 20.
Lip trident-like or with sharply projecting side lobes; inflorescences at intervals on woody stem. *Tridactyle*. p. 25.

(17) Spur bent in the middle at right angles. *Calyptrochilum*. p. 21.
Spur straight, curved or with corkscrew twist *see* (18).

(18) Spur thread-like or slightly thickened towards tip, usually several times as long as the lip, sepals and petals pure white or rarely tinted *see* (19).
Spur not thread-like *see* (20).

(19) Lip with side lobes and sharp narrow tip; spur over 6 inches long. *Leptocentrum*. p. 23.
Lip simple or with irregular edge, but no projecting side lobes. *Aerangis, Rangaeris*. p. 19, 24.

(20) Lip of varying shapes, pointed or almost square-ended, but always deeply concave. *Angraecum*. p. 20.
Lip not deeply concave *see* (21).

(21) Lip longer than broad with sides tending to roll back to enclose spur; a tubercle on the lip in front of the spur opening. *Diaphananthe*. p. 22.
Lip not tending to roll back; no tubercle *see* (22).

(22) Inflorescence made up of many dull-coloured flowers *see* (23).
Flowers wholly or mainly pure white or waxy white *see* (24).

(23) Flowers opposite or in whorls. *Chamaeangis*. p. 21.
Flowers not arranged as above, but spirally on the rhachis. *Rhipidoglossum*. p. 24.

(24) Flower with dark blotch in throat (spur funnel-shaped). *Eurychone*. p. 22.
Flower without blotch *see* (25).

(25) Flower green inside, spur no longer than lip. *Sphyrarhynchus*. p. 25.
Flower entirely waxy white (ochreous when old); spur tapered, longer than lip. *Cyrtorchis*. p. 21.

7. LIST OF SPECIES.

Within each of the two main groups, Angraecoids and Non-Angraecoids, the genera are arranged alphabetically, and within each genus the species are also alphabetical. Synonyms have been dealt with as follows. A synonym with a different specific name is given immediately after the valid name with which it is identical. To save both work and space, a name that has been sunk in another appears only once in the list, under that other, and not in its own alphabetical order. Moreover, alternative names due to changes in generic allocation, which, as already mentioned, are excessively numerous, have not been included. Thus *Listrostachys maialis* Chev. is given as a synonym of, and on the line with, *Cyrtorchis sedeni* (Rchb.f.) Schltr., but *Listrostachys sedeni* Rchb.f. does not appear. We think that, with this limitation, we have given practically all the synonyms based on records from within our area and most of those from outside.

Localities are indicated by the initial letters of the territories, K, N, NR, T, U, Z, supplemented by other abbreviated indications where the information is available and the plant concerned seems to be local, viz.:— NT=Tanganyika north of the Central Line; ST=Tanganyika south of the Central Line and, if no locality is added, within 70 miles of the head of Lake Nyasa; Usamb=Usambara; Ulug=the Uluguru Mountains.

It might have been interesting to compare the number of orchid species recorded for each of the territories but this is impracticable for several reasons:—

(*a*) Elgon and Ruwenzori are bisected by territorial borders.
(*b*) Some of the early records from between Lake Nyasa and Lake Tanganyika cannot be allocated between Tanganyika, Northern Rhodesia, and Nyasaland.
(*c*) A number of the early "Zanzibar" records most probably relate to the mainland coast and are not insular.
(*d*) Records for "Nyasa" in German publications are as a rule not from Nyasaland but north and east of Lake Nyasa, in what is now Tanganyika Territory.

In any case such a comparison by territories would really be of no phyto-geographical significance because the political boundaries for so much of their length follow no natural features. On the other hand a comparison between the orchid floras of the great mountains is both more practicable and more worth while. Consequently, Ruwenzori, Elgon, Mt. Kenya, and Kilimanjaro records are shown separately, as Ruw, Elg, Mk, Kmj, respectively. It is unfortunate that almost nothing is known of Mount Meru, which is actually higher than Elgon.

AERANGIS Rchb.f.

Perhaps the most popular and best-known genus of African epiphytic orchids. The flowers are mostly pure white with thread-like spur several times the length of the lip. *A. rhodosticta* is notable in the genus for its red column which adds greatly to the attractiveness of the flower. *A. friesiorum* is well distinguished by its blunt fleshy flower with long spur slightly thickened towards the tip. *Rangaeris* was recently split off from *Aerangis* by Summerhayes on microscopic characters (*Kew Bull.*, 1937, 227), and it will doubtless be found when all those species at present in *Aerangis* have been studied that some need to be transferred. This applies especially to the small species (flower less than 1 in. across, leaf-area less than 3 sq. ins.), marked *. On the other hand there are certainly "new" large-flowered species that are undescribed.

A. biloba (Lindl.) Schltr. ST (Fig. *Flor. W. Trop. Afr.*, 459).
A. calodictyon Summerh. T (60 miles west of Dar es Salaam).
A. collum-cygni Summerh. U.
**A. engleriana* (Krzl.) Schltr. Ruw.
**A. falcifolia* Schltr. ST.
**A. floribunda* (Rolfe) Summerh. Elg (CMH), U.
[Extremely like *Rangaeris muscicola* (Rolfe) Summerh.]
**A. graminifolia* (Krzl.) Schltr. NT (Usamb).
A. grantii (Batem.) Schltr. U.
(Flowers not described.)
A. kirkii (Rolfe) Schltr. (syn. *Angraecum apiculatum* Hook. var. *kirkii* Rchb.f., *Angraecum bilobum* Lindl., var. *kirkii* Rchb.f.) K, NT (Usamb).
A. kotschyana (Rchb.f.) Schltr. (syn. *Angraecum kotschyi* Rchf.f., *Angraecum semipedale* Rendle) NR, N, Kmj, NT, K, U (UAH). (Fig. in Engler, 1908, 423.)
**A. lutambae* Mansf. ST (Lindi).
A. luteo-alba (Krzl.) Schltr. Elg. (Kmj, Engler, 1925, 258, is suspected to be an error due to a mistranscription from Engler, 1895, 158.)
A. mystacidioides Schltr. ST.
**A. oligantha* Schltr. ST.
**A. pachyura* (Rolfe) Schltr. N.
**A. parvula* Schltr. NT (Usamb).
A. rhodosticta (Krzl.) Schltr. U (CS), K (KFH).
A. thomsoni (Rolfe) Schltr. Elg, K.
A. ugandensis Summerh. Elg. U (UAH), K (Kakamega CS).

ANCISTRORRHYNCHUS Finet

A very small genus doubtfully distinguishable from *Cephalangraecum* (*see* Mansfeld, *Notizbl. Bot. Gart. Berlin,* 12, 705).

A. laxiflorus Mansf. T (Morogoro).

ANGRAECOPSIS Krzl.

A small genus with a most graceful inflorescence. The lip of the flower is divided into three lobes almost to the base.

A. gracillima (Rolfe) Summerh. U, K.

A. tenerrima Krzl. NT (Usamb). We believe *Angraecum amaniense* Krzl. to be a synonym.

ANGRAECUM Bory

As Braid remarked (*Kew Bull.,* 1926, 324), even in its attenuated form the genus *Angraecum* is "not yet split up as it probably will be". It includes a bigger range of flower-size than any other genus, with shape of lip varying from almost lanceolate in the little *A. dives* and *A. viride* to almost square-ended in *A. giryamae.*

A. alcicorne Rchb.f. N.

[*A. amaniense* Krzl. we believe to be a synonym of *Angraecopsis tenerrima* Krzl.]

A. chamaeanthus Schltr. ST.

A. distichum Lindl. U.

A. dives Rolfe K (Mombasa), T (Dar es Salaam VH). *Flor. Trop. Afr.* gives also "Kmj, cultivated specimen", but it most probably came from the coast.

A. giryamae Rendle (syn. *A. eburneum* Rchb.f. non Thou.) Kmj, K (Mombasa), Z, NT (Usamb).

A. infundibulare Lindl. U.

A. keniae Krzl. Mk (base).

A. laciniatum Krzl. U.

A. parcum Schltr. ST.

A. sesquipedale Thou. NT (Usamb), Z. Both localities need confirmation. This is a Madagascar species with white flower several inches across and spur 15 inches long, which has not been reported in Africa since before the end of last century. (Fig. Engler, 1908, 420.)

A. stolzii Schltr. ST.

A. verrucosum Rendle (syn. *A. scabripes* Krzl.) N, NT (Usamb).

A. viride Krzl. non (Ridl.) Schltr. NT (Usamb). *A. braunii* Schltr. was a new name given to this plant presumably under the impression that the new combination *A. viride* (Ridl.) Schltr., which refers to a Madagascar species, had priority over Krzl.'s name; but on dates of

publication this appears erroneous, *A. braunii* a straight synonym of *A. viride* Krzl., and the Madagascar plant the one in need of a new name.

BOLUSIELLA Schltr.

Small plants with flattened leaves all in one vertical plane.

B. imbricata (Rolfe) Schltr. U (UFH), K.

Specimens in our collection show that the East African representation of this peculiar and dainty little genus will be much increased.

CALYPTROCHILUM Krzl.

A small genus of plants with short spur wide at the base, wide at the tip, sharply constricted and usually bent at right angles in middle.

- *C. christyanum* (Rchb.f.) Summerh. (syn. *A. moloneyi* Rolfe, *A. ivorense* Chev.) U.
- *C. mombasense* (Rolfe) Schltr. K (Mombasa).
- *C. orientale* Schltr. ST.

CEPHALANGRAECUM Schltr.

No definitely identified species of this typically West African genus can be recorded for East Africa, but specimens have been returned from Kew as

C. sp. near *glomeratum* (Ridl.) Schltr. U (UFH).

At least one other species with the typical dense round heads of almost sessile flowers occurs in East Africa (Usamb).

CHAMAEANGIS Schltr.

Leaves drooping, long and narrow, flowers minute, green or ochre, opposite or in whorls.

- *C. odoratissima* (Rchb.f.) Schltr. Elg, U. Although this species was originally described nearly 90 years ago and although its range has recently (*Kew Bull.*, 1933, 103) been given as "Cameroons, Congo, Uganda", it is not included in *Flor. Trop. Afr.* The reason for the omission is presumably that when the species was originally described no locality was given.
- *C. sarcophylla* Schltr. ST.
- *C. urostachya* (Krzl.) Schltr. NT (Usamb).
- *C. vesicata* (Rchb. f.) Schltr. K (CS), U.

CYRTORCHIS Schltr.

A genus of plants having racemes of attractive waxy white flowers, which turn pale ochre before they wither. One character given for the genus is the tapering spur; another, lost in pressed

specimens and mentioned in hardly any of the specific descriptions, is the strongly 3-angled pedicel. It is remarkable that no new species attributable to this genus has been described since last century except from the head of Lake Nyasa, but the diversity of forms is much greater than appears from the list of names. There are half-a-dozen in Usambara alone.

C. *aberrans* Mansf. ST.

C. *aschersonii* (Dur. and Schinz) Schltr. U (UFH).

C. *bracteata* Schltr. ST.

C. *brownii* (Rolfe) Schltr. U.

C. *chailluana* (Rchb. f.) Schltr. U. (A West African species; record for Usambara, Engler, 1895, 157, probably erroneous.)

C. *crassifolia* Schltr. NR. Unique in having a greenish-grey, felted, surface to the leaves.

C. *monteirae* (Rchb.f.) Schltr. (syn. *Angraecum antennatum* Krzl., *A. aschersonii* Rendle non Krzl., *Listrostachys ignoti* Krzl.) U.

C. *refracta* (Krzl.) Schltr. NT (Usamb). We cannot understand the inclusion of this species in *Cyrtorchis*. Its bent spur with inflated tip entirely fails to conform with the prime character of the genus as given by Schlechter himself.

C. *sedeni* (Rchb.f.) Schltr. (syn. *Listrostachys maialis* Chev.) NT, K, U.

C. *whytei* (Rolfe) Schltr. N, K (KFH), U (UAH), Elg.

DIAPHANANTHE Schltr.

Plants with more or less pendulous racemes of pale dull-coloured flowers, often with the sides of the lip rolled back round the spur.

D. *bidens* (Rolfe) Schltr. (syn. *Listrostachys ashantensis* Rchb.f.) U. (Fig. *Flor. W. Trop. Afr.*, 455.)

D. *fimbriata* (Rolfe) Schltr. U, NT (Mwanza BDB).

D. *kirkii* (Rolfe) Schltr. NT (Usamb).

D. *quintasii* (Rolfe) Schltr. K (Aberdares UAH).

D. *stolzii* Schltr. ST.

EURYCHONE Schltr.

A small, typically West African, genus of plants with white flowers nearly 2 inches across and short funnel-shaped spur.

E. *rothschildiana* (O'Brien) Schltr. U.

GUSSONEA A. Rich.

As stated previously, in his revision of the Angraecoids, Schlechter used this genus for all the leafless species, but in *Fl. W. Trop. Afr.* all the West African leafless orchids have been

put in *Microcoelia* Lindl. We have not been able to find the reasons for this change and since, in any case, the necessary combinations with *Microcoelia* have not been published for most of the East African species we here keep them all in *Gussonea*. It is, of course, questionable whether absence of leaves is a good generic character, but this will only be determinable after much more study of the flowers, most of which are minute.

Some species (e.g., *G. aphylla*) have a long stem, on which racemes are borne at intervals. In others the stem is reduced to a mere wart, no more than enough to carry the closely-packed bases of the roots; and, from this, abundant racemes of white flowers arise, having the appearance of white heather.

G. aphylla A. Rich. K(coastal S.E.), T (Dar es Salaam AH).
G. chilochistae (Rchb.f.) Schltr. (syn. *Angraecum aphyllum* Krzl. non Thou., *Microcoelia exilis* Lindl.) K (coastal S.E.), NT (Usamb—Kilosa BDB).
G. friesii Schltr. NR.
G. globulosa (Ridl.) Schltr. (syn. *A. guyonianum* Rchb.f., *Saccolabium radicosum* A. Rich., *Microcoelia* ? *taeniophyllum* Hochst.) ST, NT (Usamb, AH), K (S.E. corner).
G. koehleri (Schltr.) Schltr. NT (Usamb).
G. megalorrhiza (Rchb.f.) Schltr. N, NT.
G. smithii (Rolfe) Schltr. Kmj, NT (Usamb AH).
G. stolzii Schltr. ST.

It will be noted that not a single record can be included for U or for K except round Mombasa, though the genus is certainly represented in the interior.

LEPTOCENTRUM Schltr.

A small East African genus with long-spurred white flowers nearly 2 inches across, very like *Aerangis*, but lip with an irregular, almost serrate, edge and sharp point.

L. amaniense (Krzl.) Schltr. NT (Usamb).
L. schliebenii Mansf. ST (Mahenge).

LISTROSTACHYS Rchb.f.

L. cirrhosa Krzl. NT (Usamb). The original description gives, in detail, all the characters of a *Tridactyle* and we can only think the species has been left in *Listrostachys* through inadvertence.

MYSTACIDIUM Lindl.

This genus formerly accommodated many of the Angraecoids. Schlecter in his revision maintained the genus for a few species, but the characters given are microscopic. It may be

doubted whether all the following species, especially the first, are to be kept in *Mystacidium*.

M. duemmerianum Krzl.	U.
M. longifolium Krzl.	Mk.
M. pedunculatum Rolfe	N.
M. ugandense Rendle	U.

PODANGIS Schltr.

A small, typically West African, genus with iris-like leaves but (unlike *Bolusiella*) spur longer than lip.

P. dactyloceras (Rchb. f.) Schltr. (syn. *Listrostachys forcipata* Krzl.) U (UFH), NT (Mwanza BDB).

RANGAERIS Summerh.

See remarks under *Aerangis*.

R. brachyceras Summerh. Elg, U.

R. muscicola (Rolfe) Summerh. (syn. *Mystacidium batesii* Rolfe) K, U, T.

RHIPIDOGLOSSUM Schltr.

A small genus, mainly West African, revised by Summerhayes in *Blumea* Suppl. 1, 78-86, 1937.

R. rutilum (Rchb.f.) Schltr. (syn. *Listrostachys gabonensis* Rolfe, *L. multiflora* Rolfe, *Angraecum woodianum* Schltr., *Listrostachys margaritae* De Wild., *Chamaeangis schliebenii* Mansf.) U, K, NT (Usamb), ST (Mahenge; Lindi), N.

R. xanthopollinium (Rchb.f.) Schltr. (syn. *Aeranthus erythropollinius* Rchb. f., *A. gerrardi* Rchb. f., *Listrostachys scheffleriana* Krzl., *Mystacidium mahonii* Rolfe, *R. woodianum* Schltr. in part). U, NT (Usamb).

These two species produce masses of aerial roots that are often more prominent than the leaves: the small flowers, arranged on the raceme in spirals, vary in colour from whitish to dull red. Those of *R. rutilum* are also occasionally green.

SARCORRHYNCHUS Schltr.

A genus consisting only of one West African species and the following, the original description of which (*Notizbl.*, 13, 413) is faulty, in that the spur is given as hanging, curved, but only ".18 mm." long. The 2-3 green flowers are stated to be barely ¼ inch across.

S. orientalis Mansf. NT (Nguru Mountains).

SPHYRARHYNCHUS Mansf.

A monotypic genus. Plant almost stemless, leaves barely 1 inch long, but flowers up to 1¼ inches across, white outside, green inside, with spur no longer than lip.

S. schliebenii Mansf. T (Ulug).

TRIDACTYLE Schltr.

An easily recognized genus. The plants develop long woody stems; leaves often remain only at the tip, but flower sprays are produced at intervals along the stems. The flowers, which are greenish, whitish or ochreous, have the lip divided into three, the side lobes often breaking up into brittle hairs.

T. armeniaca (Lindl.) *Schltr.* (syn. *Angraecum whitfieldii* Rendle) Ruw.
T. brevifolia Mansf. ST (Ulug).
T. filiformis (Krzl.) Schltr. U (UFH).
T. fimbriata (Rendle) Schltr. NT, K, Elg, U.
T. frommiana (Krzl.) Schltr. Between Lake Tanganyika and Lake Nyasa.
T. goetzeana (Krzl.) Schltr. ST.
T. lepidota (Rchb. f.) Schltr. U.
T. linearifolia (De Wild.) Schltr. U (UFH).
T. nyassana Schltr. ST.
T. pulchella Schltr. ST.
T. sarcodantha Mansf. ST (Ulug).
T. schumannii (Krzl. Summerh. ST (Ulug)—otherwise West African.
T. scottellii (Rendle) Schltr.. U (UFH), Ruw, K (KFH).
T. teretifolia Schltr. NR.
T. tridactylites (Rolfe) Schltr. (syn. *Aeranthus deistelianus* Krzl.). N.
T. unguiculata Mansf. ST (Iringa).
T. virgula (Krzl.) Schltr. Ruw.
T. wakefieldii (Rolfe) Summerh. K, T (Dar es Salaam VH).

NON-ANGRAECOIDS.

ACAMPE Lindl.

A genus mainly Indo-Malayan and Mascarene, formerly included under *Saccolabium* Blume.

A. pachyglossa Rchb.f. K (Mombasa), T (Dar es Salaam VH; Uluguru GBW).
A. mombasensis Rendle K (Mombasa).
A. nyassana Schltr. ST.

All much alike, with short heads of fleshy flowers, yellow-green dotted and barred with red. *A. pachyglossa* has narrower

and less spathulate petals than *A. mombasensis* and *A. nyassana* is said to have a ridged lip.

Considering how conspicuous these plants are along the coast it is amazing that both the first two species should be recorded in literature from nowhere but Mombasa. Our evidence is that they occur together south at least to Dar es Salaam and *A. mombasensis* up to 160 miles inland from there. No record more than 2,000 ft. above sea-level. Schlechter (*Bot. Jahrb.*, **53**, 494) says the genus occurs in Uganda, but Uganda botanists are of opinion that this is wrong.

ANCISTROCHILUS Rolfe

A typically West African genus consisting only of: —

A. rothschildianus O'Brien (UFH).

A. thomsonianus Rolfe U (UFH).

Summerhayes (*in litt.*) thinks the second may be only a synonym of the first. Flowers practically white, 2 inches across, with an attenuate purple lip an inch long (fig. Engler, 1908, 417).

ANSELLIA Lindl., "Leopard Orchid".

A. africana Lindl. (syn. *A. confusa* N. E. Brown) Elg (UAH), U. (A predominantly West African species.)

A. gigantea Rchb. f. var. *nilotica* (Baker) Summerh. (syn. *A. humilis* Bull). U, K "south to Transvaal".

The above conclusions were reached by Summerhayes in a recent review of this small, purely African, genus (*Kew Bull.*, 1937, 462). Those who have seen the striking range of forms occurring in Kenya will find it difficult to believe that all should bear not only the same specific, but even the same varietal, name.

BULBOPHYLLUM Thou.

The genus, which now includes *Megaclinium* Lindl., extends throughout the tropics and contains several hundred species.

B. amanicum Krzl. NT (Usamb).

B: bequaertii De Wild. U (UFH).

B. cochleatum Lindl. (syn. *B. talbotii* Rendle) K, U.

B. cocoinum Batem. ex Lindl. U (UAH).

B. coriscense Rchb.f. NT (Usamb) in Engler (1895, 157) needs confirmation: species otherwise recorded only from Gulf of Guinea.

B. cupuligerum Krzl. U (UFH), Mk. Fig. Milbraed, 1910, pl. 9.

B. falcatum (Lindl.) Rchb. f. (syn. *B. leptorrhachis* Schltr., *Megaclinium endotrachys* Krzl.) U.

B. gilgianum Krzl. ST (Uhehe).

B. gravidum Lindl. (syn. *B. monticolum* Hook.f.) K (Kericho CMH).

B. *mahonii* Rolfe. N.
B. *melleri* Rchb.f. N.
B. *nyassanum* Schltr. ST, T (Dar es Salaam VH).
B. *oreonastes* Rchb. f. (syn. *B. fuscum* Rendle, *B. obanense* Rendle) U (UFH), NR (BDB).
B. *oxypterum* (Lindl.) Rchb.f. ST. (Fig. Engler, 1908, 413).
B. *platyrhachis* (Rolfe) Summerh. non De Wild. N, NT (Usamb AH), U.
B. *pobeguinii* (Finet) De Wild. (syn. *B. chevalieri* De Wild., *Megaclinium clarkei* Rolfe) U (UFH).
B. *pusillum* (Rolfe) Summerh. T.
B. *schimperianum* Krzl. (syn. *B. xanthoglossum* Schltr.). U (UAH).
B. *schlechteri* De Wild. U (UFH).
B. *stolzii* Schltr. ST.
B. *ugandae* Rolfe U.
B. *usambarae* Krzl. NT (Usamb).
B. *winkleri* Schltr. (syn. *B. imogeniae* K. Hamilt.) U (UAH), ST.

On published records the genus *Bulbophyllum* is altogether better represented in West Africa than in East Africa, where moreover a large proportion of the records relate to Uganda and to typically West African species. This impression may need to be modified: we have actually in cultivation already from the north-eastern quarter of Tanganyika as many species of *Bulbophyllum* as there are on the whole East African list.

Many of the species are bizarre and within the genus there is great variation. At one extreme *B. cupuligerum* is a minute plant with solitary flowers and with leaves and pseudobulbs all flat on the surface of the host. At the other extreme *B. platyrhachis* has its flower stalk expanded into what looks like a narrow olive-green leaf up to a foot long and carrying a hundred or more flowers.

CIRRHOPETALUM Lindl.

C. *africanum* Schltr. ST.

A small genus ranging east across the Indian Ocean to Tahiti. Some years before *C. africanum* was described the genus was recorded from NT (Usamb), where it is common, under the name of the Madagascar species, *C. thouarsii* Lindl. This identification has never been corrected, but if *C. africanum* really is distinguishable, the Amani plants doubtless also belong to that form. When not in flower the plant would pass as a *Bulbophyllum*.

EULOPHIOPSIS Pfitz

E. *lurida* (Lindl.) Schltr. U.

Eulophia longicollis Lindl., *Eulophia virilis* Lindl. are cited as synonyms in *Flor. Trop. Afr.* but not in *Flor. W. Trop. Afr.*

LIPARIS Rich.

A widespread genus predominantly terrestrial, but with a few epiphytic species.

L. epiphytica Schltr. (syn. *L. lloydii* Rolfe). U.

In the original description (*Bot. Jahrb.*, 38, 6) the species is said to have ovoid pseudobulbs, but they are not shown in the figure (*ibid.*). Another, undescribed, epiphytic species with prominent yellow-green pseudobulbs occurs in Usambara.

OBERONIA Lindl.

O. disticha (Lam.) Schltr. (syn. *O. brevifolia* Lindl.) NT (Usamb), U, K (Kakamega CS).

A typically Far Eastern genus with one species in Madagascar and one, very similar, occurring across Africa to the Gulf of Guinea. The tiny orange flowers form a fox-tail spike.

POLYSTACHYA Hook.

This mainly African genus, with many attractive forms, was monographed by Kraenzlin (*Repert. spec. nov. regni veget. Beih.* Bd. 39, 1926). He divided the genus, mainly on vegetative characters, into 12 sections, of which the following occur in Africa, but, so far as we know at present, the first and the last not within our limits. In any case the accepted classification of the species in the last section, *Bulbophylloidae,* is as a separate genus, *Genyorchis* Schltr.:—

(*a*) *Aporoidae.*
(*b*) *Caulescentes.*
(*c*) *Elasticae.*
(*d*) *Calluniflorae.*
(*e*) *Eupolystachyae.*
(*f*) *Grandiflorae.*
(*g*) *Affines.*
(*h*) *Superpositae.*
(*i*) *Cultriformes.*
(*j*) *Dendrobianthe.*
(*k*) *Bulbophylloidae.*

Summerhayes (*Kew Bull.*, 1931, 387) regards this classification into sections as generally satisfactory, but it is by no means devoid of difficulties and a number of changes in Kraenzlin's allocation have been made since his monograph was published. Since the presence or nature of pseudobulbs is used as a main criterion it is important that in collecting herbarium material pseudobulbs should be included if any can be found on the plant. The following sections are immediately recognizable:—

(*h*) *Superpositae.* The new season's growth emerges from one of the internodes of the old one, not from its base.

(*i*) *Cultriformes*. Only a single leaf is borne by the swollen stem (which emerges from the base of an older one).

The species in *Dendrobianthe* are peculiar in having comparatively flat open flowers, less fleshy in texture than most Polystachyas. The plants are either terrestrial (some were originally ascribed to the genus *Eulophia*) or epiphytic on *Vellozia*. Although nearly a dozen species have been described there seems such a tendency for them to intergrade that Schlecter (*Bot. Jahrb.*, 53, 568) has considered lumping them.

(*d*) *P. adansoniae* Rchb.f. Elg.
(*i*) *P. angustifolia* Summerh. Ruw (UAH).
(*d*) *P. ashantensis* Krzl. U.
(*i*) *P. bicarinata* Rendle Ruw, U (UFH).
(*e*) *P. buchananii* Rolfe N, ST, K (doubtful).
(*i*) *P. caespitifica* Krzl. NT (Usamb).
(*d*) *P. calluniflora* Krzl. (syn. *P. trogonochila* Krzl.) U (UFH).
(*e*) *P. candida* Krzl. "E. Trop. Afr."
(*i*) *P. coelogynochila* Krzl. "E. Afr."
(*i*) *P. convallarroidea* Mansf. ST (Ulug).
(*i*) *P. cultriformis* (Thou.) Spreng. (syn. *P. cultrata* Lindl.) Kmj, NT (Usamb) Elg, Ruw, K (CS), U (UFH). *P. galericulata* Rchb. f. is also cited as syn. by Krzl. (Monog., p. 128) but wrongly—Summerh. *Kew Bull.*, 1935, 197.
  P.c. var. *autogama* Schltr. Mk.
  P.c. var. *africana* Schltr. Mk, N.

These varieties are not mentioned in Kraenzlin's monograph.

(*j*) *P. dendrobiiflora* Rchb. f. Cultivated, purporting to come from Dar es Salaam; also ST (Ulug EBC).
(*f*) *P. doggetti* Rendle and Rolfe Ruw.
P. duemmeriana Krzl. U. (Section not known to us. The species was described after the monograph in a publication that is not available.)
(*d*) *P. erythrosepala* Summerh. NR.
(*c*) *P. eurychila* Summerh. Elg, U (Debasien).
(*i*) *P. fallax* Krzl. U.
(*g*) *P. fischeri* Rchb. f. Kmj, NT (Usamb AH).
(*j*) *P. flexuosa* (Rolfe) Schltr. Kmj. Terrestrial: but perhaps not correctly allocated to section *Dendrobianthe* (*Kew Bull.*, 1934, p. 211).
(*h*) *P. fusiformis* Lindl. (syn. *P. minutiflora* Ridl.) NT (Usamb), ST (Ulug EBC).
(*f*) *P. goetzeana* Krzl. ST.
(*d*) *P. golungensis* Rchb.f. (syn. *P. johnsonii* Krzl., *P. coriacea* Rolfe, *P. mayombensis* De Wild., *P. spiranthoides* Krzl.) N, NT (Usamb AH), Elg, K (CS), U (UFH).

(*i*) *P. gracilenta* Krzl. Ruw.
(*f*) *P. heckmanniana* Krzl. ST (Ulug).
(*j*) *P. holtzeana* Krzl. NT (Nguru).
(*b*) *P. imbricata* Rolfe (syn. *P. kraenzlinii* Rolfe, *P. rendlei* Rolfe, *P. shirensis* Krzl. non Rchb.f.) N, NT (Usamb), Ruw (UAH), Elg (UAH), K (KFH), U (UFH). (*P. nigrescens* Rendle was in Krzl. Monog. treated as another synonym, but this finding was reversed in *Kew Bull.*, 1933, 102.)
(*f*) *P. inconspicua* Rendle U.
(*f*) *P. ionocharis* Krzl. (mis-spelt *P. conocharis* in Engler, 1908). ST (Ulug).
P. isochiloides Summerh. NT. Section uncertain.
(*g*) *P. johnstonii* Rolfe NR, N.
(*f*) *P. kilimanjari* Rchb.f. (syn. *P. holstii* Krzl.) K (behind Mombasa), *not* from Kmj.
(*i*) *P. kirkii* Rolfe K.
(*f*) *P. lawrenciana* Krzl. N.
(*b*) *P. laxiflora* Lindl. (syn. *P. dixantha* Rchb. f., *P. galericulata* Rchb.f.) U.
(*e*) *P. lepidantha* Krzl. U.
(*e*) *P. lettowiana* Krzl. ST.
(*h*) *P. lindblomii* Schltr. U. (Omitted from Krzl. Monog. but evidently one of the *Superpositae*.)
P. longiscapa Summerh. ST (Ulug). Terrestrial and not allocable to any of Kraenzlin's sections (*Kew Bull.*, 1934, p. 211).
(*f*) *P. minima* Rendle N.
(*j*) *P. miranda* Krzl. (syn. *P. busseana* Krzl., *P. holochila* Schltr.) N, ST (also Ulug EBC). Terrestrial and on *Vellozia*.
(*e*) *P. mukundaensis* De Wild. (syn. *P. dorotheae* Rendle, *P. huyghei* De Wild., *P. plehniana* Schltr.) U.
(*b*) *P. musozensis* Rendle U.
(*b*) *P. nigrescens* Rendle N, ST (Ulug EBC), Elg, Ruw, K (Aberdares UAH).
(*i*) *P. nyanzensis* Rendle U.
(*i*) *P. obanensis* Rendle K.
(*e*) *P. odorata* Lindl. (syn. *P. usambarensis* Schltr.) U, NT (Usamb).
(*b*) *P. oligophylla* Schltr. ST.
(*f*) *P. ottoniana* Rchb.f. var. *confusa* (Rolfe) Krzl. Kmj. The name *P. campyloglossa* Rolfe, sunk by Kraenzlin in *P. ottoniana*, has recently been applied by Kew to specimens from the Kenya Highlands. The type of *P. campyloglossa*, flowered in England, is supposed to have come from Mombasa, but was probably from Kmj, or Kenya Highlands.

(*b*) *P. paniculata* Rolfe U.
(*d*) *P. polychaete* Krzl. (syn. *P. euspatha* Krzl.) U, NT (Bukoba, Usamb AH). (In Krzl. Monog. p. 38, *P. nigerica* Rendle is given as another syn. of *P. polychaete,* but in *Fl. W. Trop. Afr.* as syn. of *P. albo-violacea* Krzl.)
(*c*) *P. pseudo-disa* Krzl. U (doubtful — see *Kew Bull.,* 1939, 492).
(*i*) *P. purpureo-alba* Krzl. Ruw.
(*d*) *P. ramulosa* Lindl. U.
(*f*) *P. repens* Rolfe U.
(*e*) *P. rufinula* Rchb.f. Apparently known only from cultivated specimens supposed to have come from "Zanzibar".
(*h*) *P. ruwenzoriensis* Rendle Ruw, Elg.
(*i*) *P. schinziana* Krzl. Ruw.
(*d*) *P. seticaulis* Rendle U or K (UAH).
(*d*) *P. shega* Krzl. NT (Usamb; Mt. Meru).
(*b*) *P. shirensis* Rchb. f. non Krzl. N.
(*h*) *P. simplex* Rendle (syn. *P. aristulifera* Rendle, *P. pachyrhiza* Krzl.) Kmj, Elg, Ruw, K, U. (Kraenzlin's allocation of this species to Section *Calluniflores* has been altered in *Kew Bull.,* 1939, 499.)
(*h*) *P. spatella* Krzl. (syn *P. elliotii* Rendle) Elg, Ruw, K.
(*b*) *P. stauroglossa* Krzl. (syn. *P. graminoides* Krzl). U.
(*d*) *P. steudneri* Rchb.f. (syn. *P. beccarii* Rchb.f., *P. ellenbeckiana* Krzl.) Elg, U (Debasien), K (Kipkarren CHM). (*P. bennettiana* is in Krzl. Monog. also cited as syn., but this is reversed in *Kew Bull.,* 1939, 492.)
(*d*) *P. stricta* Rolfe NT (Arusha AH), K, Elg, U. (Perhaps this should be in Section *Caulescentes*—*Kew Bull.,* 1939, 492.)
(*d*) *P. stuhlmannii* Krzl. NT (Bukoba), U (UFH), K (KFH).
(*j*) *P. tayloriana* Rendle (syn. *P. kaessneriana* Krzl., *P. macropetala* Krzl.) N, T, Kmj, K. Terrestrial and epiphytic on *Vellozia;* at one time put in *Eulophia.*
(*e*) *P. tessellata* Lindl. (syn. *P. praealta* Krzl., *P. gracilis* De Wild., *P. latifolia* De Wild.) U.
(*h*) *P. ugandae* Krzl. U, "Zanzibar" (which needs to be confirmed and defined).
(*g*) *P. villosa* Rolfe NR, N, ST.
(*i*) *P. vulcanica* Krzl. U (UFH).
(*d*) *P. woosnamii* Rendle (syn. *P. longevaginata* Krzl.) Ruw.
(*j*) *P. xerophila* Krzl. NT (Usamb).
(*g*) *P. zambesiaca* Rolfe (syn. *P. malilaensis* Schltr.) N, ST.
(*e*) *P. zanguebarica* Rolfe "Zanzibar" ?insular.

STOLZIA Schltr.

A genus said by its author to have the habit of a *Polystachya,* that is, with the inflorescence arising from the top of the pseudobulb, and the flowers of a *Bulbophyllum.* The limited distribution is remarkable.

S. angustifolia Mansf. ST (Ulug).
S. atrorubra Mansf. ST (Ulug).
S. nyassana Schltr. ST.
S. oligantha Mansf. ST (Ulug).

CORYNDON MEMORIAL MUSEUM EXPEDITION TO THE CHYULU HILLS.

IX. DERMAPTERA.

By W. D. Hincks, F.R.E.S.

The Earwigs collected by the Expedition and submitted for study by Mr. A. F. J. Gedye comprise forty-nine specimens of four species, 2 of which are represented by single examples. One species, *Echinosoma wahlbergi* is a widely distributed African form known from Portuguese Guinea in the west to Abyssinia in the east and south to the Cape. The remaining species are much more restricted in range, two at least being recognised components of a small but interesting alpine fauna associated with the mountain ranges and massifs of Tropical Africa. For information on this subject, limited as the known data is, reference should be made to the papers of Burr (1907, Kilimanjaro), Menozzi (1938, East Africa), and Hincks (1938, Mufumbiro Volcanoes).

Little can be said of the habits or biology of any African Dermaptera and great indeed is the need for observations and data of even the most elementary kind.

Superfamily *LABIDUROIDEA*.
Family *PYGIDICRANIDAE*.
Subfamily *ECHINOSOMATINAE*.

ECHINOSOMA WAHLBERGI Dohrn, 1863.

Echinosoma wahlbergi Dohrn, Stettin Ent. Zeitschr., **24,** 1863: 64, ♂. (Caffraria.)

Echinosoma distanti Burr, in Distant Ins. Transv., 1910: 252, fig. 48, ♂. (Transvaal)

Chyulu Hills, alt. 5,600 ft., June, 1938, 1♂.

Although this widely-distributed species has not always been correctly identified by previous authors the male is readily recognised by the lateral keels of abdominal tergites V and VI and the long and convoluted virga of the genitalia. The truncate but not transverse pygidium distinguishes the female.

Despite inaccuracies in the records *E. wahlbergi* is certainly very widely distributed in Africa. Based on the literature the following is the recorded range: Portuguese Guinea, Liberia, Togo, Cameroons, Fernando Po, French Congo, Belgian Congo, Angola, Uganda, Abyssinia, Kenya, Tanganyika, Zanzibar, Mozambique, Zululand, Natal, Transvaal and Cape Colony.

The Chyulu male agrees perfectly with material from Belgian Congo in my collection.

Family *LABIDURIDAE*.
Subfamily *PSALIDINAE*.

GELOTOLABIS FELIX (Burr, 1907). (Fig. 1.)

Anisolabis felix Burr, in Sjöstedt Kilimandjaro, Orth., **17, 1907**: 4, pl. 1, fig. 4, 4a. ♂♀. [Kilimanjaro ca. 3,000 m. (approx. 10,000 ft.).]

Horridolabis paradoxura Zacher, Zool. Jahrb., **30**, 1911: 384, figs. L^2, M^2. ♂. (Kenya: Kikuyu Escarpment.)

Chyulu Hills, alt. 5,600 ft. (approx. 1,700 m.), July, 1938, 1♂.

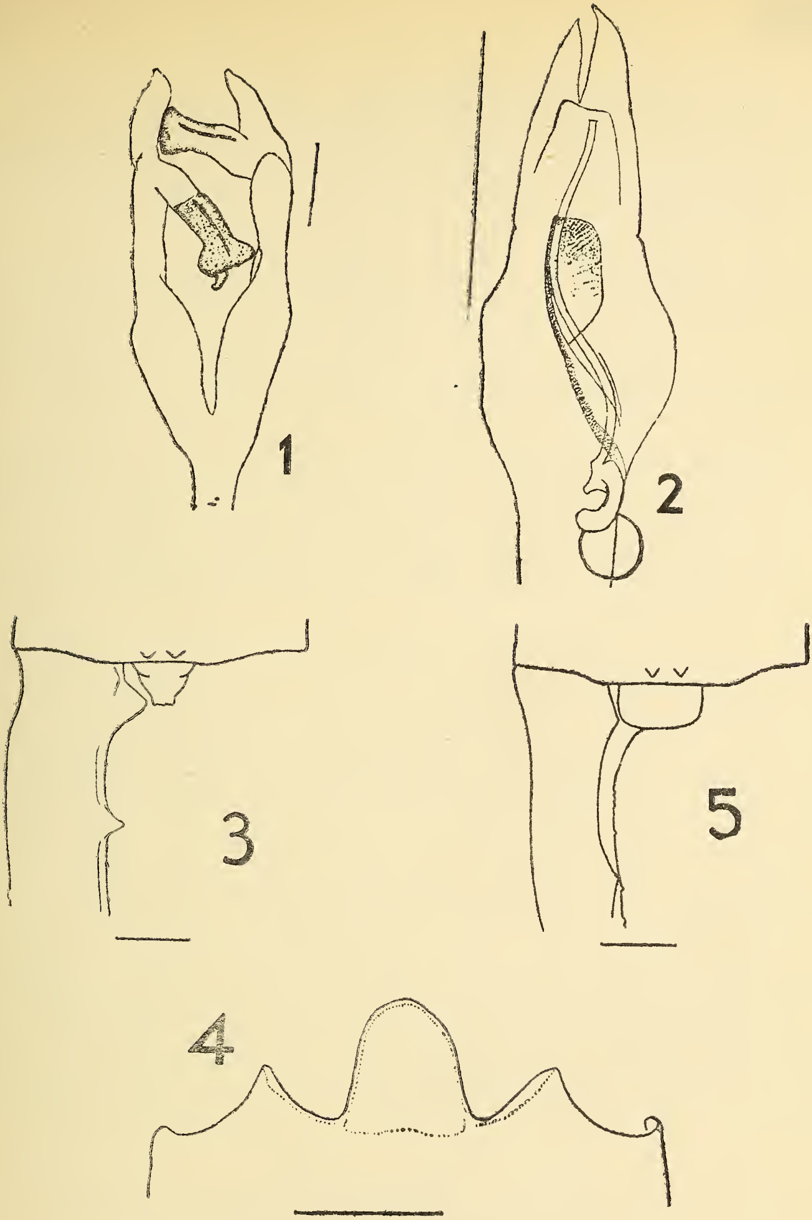
The species grouped under the name *Gelotolabis* are a specialized branch of the cosmopolitan genus *Anisolabis* and the status of the many divisions of the latter is still debated.

This is a very interesting species regarded as one of the African montane forms and was first recorded from about 10,000 ft. on Kilimanjaro whence Borelli (1915) has since noted it at various stations and also on Mt. Kenya. Menozzi (1938) has records from Mt. Elgon 3,500 m. to 4,000 m. (approx. 11,500 ft. to 13,000 ft.), Mt. Marakwet about 3,426 m. (approx. 11,500 ft.), Mt. Kinangop 3,500 m. to 3,700 m. (approx. 11,500 ft. to 12,200 ft.), and Mt. Aberdare 2,900 m. to 3,100 m. (approx. 9,500 ft. to 10,200 ft.). He states that *G. felix* is characteristic of the alpine zone over 2,500 m. (approx. 8,200 ft.). It will be seen that of the localities where altitudes are noted the present record represents the lowest limit at which the species has yet been found. Burr (1912), however, has a record "Loangwa River, Mpeta." It is presumed that this refers to a Northern Rhodesia locality. The L*u*angwa River is in the north-eastern part of this territory and to its west is Mpika which may be the locality intended. There is, however, a Loangwa River in the north-west, flowing into Lake Mweru, but I cannot trace Mpeta in this area. Zacher's type locality is the Kikuyu Escarpment in Kenya (8,200 ft.), no altitude is, however, stated in the original citation.

Additional unpublished Kenya records from altitudes of over 9,000 ft. will be given in a forthcoming paper.

The genitalia of the male specimen are here figured for comparison with Zacher's illustration referred to above.

Superfamily *FORFICULOIDEA*.
Family *LABIIDAE*.
Subfamily *LABIINAE*.



EXPLANATION OF FIGURES.

(Drawn by the writer with the aid of a squared eyepiece; the scale against each represents approximately half a millimetre.)

FIG. 1. Male genitalia of *Gelotolabis felix* (Burr). (Parameres shrunken, do not show characteristic shape despite treatment with KOH.)
FIG. 2. Male genitalia of *Chaetospania rodens* Burr.
FIG. 3. Portion of apical segments of male *C. rodens* showing pygidium and part of one limb of forceps.
FIG. 4. Part of penultimate sternite of male *C. rodens* showing manubrium.
FIG. 5. Portion of apical segments of female *C. rodens* showing pygidium and part of one limb of forceps.

CHAETOSPANIA RODENS Burr, 1907. (Figs. 2 to 5.)

Chaetospania rodens Burr, in Sjöstedt Kilimandjaro, Orth., **17**, 1907: 7, pl. 1, fig. 5. ♂♀. [Kilimanjaro, Kibonoto (cultivated zone) 1,300 m. to 1,900 m. (approx. 4,400 ft. to 6,300 ft.).]

Chyulu Hills, 5,200 ft. to 6,000 ft., April-July, 1938, 5♂♂, 5♀♀, 2 juv. [April 1♀, 1 nymph, 5,200 ft.; May 1 nymph, 5,400 ft.; June 2♂♂, 1♀ (damaged), 5,600 ft.; July 1♂, 5,600 ft., 2♂♂, 3♀♀, 6,000 ft.] Length including forceps ♂, 9 mm. to 12 mm.; ♀, 9 mm. to 11 mm.

Hitherto this species has not been recorded from Kenya. All previous records are from Tanganyika, mostly in the Kilimanjaro area, except for a single note by Burr (1912) of a specimen from Ukaika-Mawambi in Belgian Congo.

Probably most of the reports of this insect are from high altitudes, but that this is not entirely the case, is evident from Burr's (1907B) Amani record.

One male in the present series (July, 6,000 ft.) is interesting in having the wings reduced to such an extent as not to be visible beyond the distal margin of the tegmina. This specimen is rather slenderer than the others and the abdominal punctuation appears heavier. The latter character, however, varies to some extent in the series although it is always stronger in the male than the female. This brachypterous male appears to differ in no other particular.

Burr in his original description does not mention the obvious pair of tuberculiform prominences on the distal margin of the ultimate tergite above the pygidium in both sexes.

The male genitalia is here figured for the first time, together with the manubrium of the male and apical segments of the abdomen showing the forceps and pygidium in both sexes.

C. rodens is closely allied to *C. ugandana* Borelli, 1907 (Uganda: Ibanda), also recorded from the Cameroons and Belgian Congo, but may be distinguished by the male genitalia, pygidium and coloration, especially of the legs, in both sexes.

Family *FORFICULIDAE.*
Subfamily *FORFICULINAE.*

FORFICULA SJOSTEDTI Burr, 1907.

Forficula sjöstedti Burr, Trans. Ent. Soc., Lond., **1907**: 116. ♂♀. (Kilimanjaro, Kiboscho.)

Forficula bequaerti Menozzi, Rev. Zool. Bot. Afr., **19**, 1930: 96, figs. 1, 2. ♂♀. (Belgian Congo: "Mt. Ninagonga and Burunga.")

Forficula sjöstedti var. *fusca* Borelli, Bull. Mus. Hist. Nat., *Paris*, **1912**: 20. ♂. (Kilimanjaro, Kiboscho.)

Chyulu Hills, 5,200 ft. to 6,000 ft., April-July, 1938, 8♂♂, 6♀♀, 21 juv. [April 2 nymphs, 5,200 ft.; April 1♂ (immature), 1 nymph, 5,600 ft.; May 1♂ macrolabic phase, 5,200 ft.; June 3♂♂, 3♀♀, 9 nymphs, 5,600 ft.; June 1♂, 1♀, 2 nymphs, 6,000 ft.; July 2♂♂, 1♀, 6 nymphs, 5,600 ft.; July 1♀, 1 nymph, 6,000 ft.]

These specimens exhibit various degrees of shrinkage and distension so that accurate measurements are not desirable. The macrolabic male is, however, in good condition and measures 11 mm. body, and 6.5 mm. forceps. The other males approximate 11 mm. body, and 4 mm. forceps. The corresponding figures for the females are 10-11:2.

The present series agrees well with the material recorded by me (Hincks, 1938) from the Mufumbiro Volcanoes in Belgian Congo.

The variety *fusca* of Borelli cited above is not worth distinguishing.

F. sjöstedti is a wingless species characteristic of certain volcanic areas where it is often the only earwig found at altitudes of about 2,500 m. (approx. 8,000 ft.) and over. It is a dominent insect at these stations and Sjöstedt collected over 500 specimens on Kilimanjaro from which series Burr first diagnosed the species.

Nearly all the records hitherto published are included in the following summary:—

Belgian Congo and Ruanda:

Mufumbiro Volcanoes, Burr 1912; Rehn 1925, 2,900 m. to 3,300 m. (approx. 9,500 ft. to 11,000 ft.); Menozzi 1930; Hincks 1938, 1,900 m. to 3,475 m. (approx. 6,300 ft. to 11,500 ft. Volcanoes Sabinyo, Karisimbi, Mikeno, Nyiragonga, Gahinga, and Kinago).

Tanganyika:

Kilimanjaro, Burr 1907A, 2,000 m. to 4,000 m. (approx. 6,500 ft. to 13,000 ft.); Burr 1912; Borelli 1915; Borelli 1912, 1915 (var. *fusca*) 1,000 m. to 1,700 m. (approx. 3,300 ft. to 5,600 ft.).

Meru, Burr 1907A, 4,000 m. to 4,300 m. (approx. 13,200 ft. to 14,200 ft.

KENYA:

Mt. Kenya, Borelli 1915, 1,800 m. (approx. 6,000 ft.) .
Aberdare Mts., Borelli 1915, 3,000 m. to 3,100 m. (approx. 9,900 ft. to 10,200 ft.).
Mt. Elgon.
Kikuyu Escarpment.
Elgeyu Escarpment.
Mt. Marakwet, Menozzi 1938, 2,300 m. to 3,500 m. (approx. 7,600 ft. to 11,600 ft.).
Mau Escarpment, Borelli 1915 (var. *fusca*), 2,420 m. (approx. 8,000 ft.).

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NOTES ON *SIMOPITHECUS OSWALDI* ANDREWS FROM THE TYPE SITE.

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(PUBLISHED BY PERMISSION OF THE MUSEUM TRUSTEES.)

Introduction.

In 1916, the late Dr. Andrews of the British Museum published a detailed account of the fossil remains of a new genus of baboon from the fossil beds near Homa Mountain, Kenya. This material had been collected by Dr. Felix Oswald at a site which had been originally discovered by Mr. Milliken. The description was published in 1916, and the new species was given the name of *Simopithecus oswaldi.*

In 1932 and 1935, the writer revisited these fossil beds and identified the actual spot from which Dr. Oswald obtained his original material. Fresh collections were made and among the material collected on those two visits were parts that were later found to fit the broken fragments in the earlier collection.

The collections made in 1932 and 1935, were presented to the Natural History Museum, South Kensington, and in 1936, Dr. Hopwood published a brief preliminary note.

At Christmas time, 1941, the present writer took the opportunity provided by a few days leave from his war-time duties to revisit the Homa fossil beds at Kanjera, and was rewarded by the discovery of the material which is the basis of the present paper. This consists of an almost complete skull of an adult male *Simopithecus,* an incomplete adult female skull and the mandible of a juvenile.

The material on which Dr. Andrews based his original description of the new genus consisted of part of a female skull, a part of the mandible of a female, a small, right, maxilla fragment, two, left, mandibular fragments, and two, isolated, male canine teeth. There were also some fragments of limb bone and other parts of the skeleton.

Among the 1932 and 1935 material was a nearly-complete female skull and much other material; but, so far, only the female skull has been described so far as the writer is aware, and that very briefly (*Loc. cit.*).

The discovery of the almost-complete, male skull in December, 1941, is of special interest, as it shows us for the first time what the male of *Simopithecus* is like, while the fact that the skull is so complete provides excellent material on which to base a better understanding of the affinities of the genus.

The Homa Mountain fossil beds are not confined to one series of exposures nor are they all of one age so that before proceeding to the description of the new material it is necessary to say a few words about the particular beds which have yielded all the *Simopithecus* material.

The site from which Oswald got his original material and from which all the rest has come also, was renamed Kanjera in 1932, to distinguish it from the Kanam and Rawi beds in the same vicinity at the foot of Homa Mountain. The Kanjera beds are of the same age as the Oldoway fossil beds and contain much the same fauna, including *Elephas antiquus, Hippopotamus gorgops, Hipparion, Metridiochoerus, Pelorovis,* etc. The Kanjera beds also contain hand-axes of the stage known as Acheulean 4 and they also yielded the fragmentary Kanjera fossil skulls.

The fossil beds are old lake deposits laid down when Lake Victoria was much more extensive than it is to-day during what is called the Kamasian Pluvial, in Middle Pleistocene times.

The material to be described in this paper is in the Palaeontological collections of the Coryndon Museum, Nairobi, Kenya.

ORDER *PRIMATES.*
FAMILY *CYNOPITHECIDAE.**
GENUS *SIMOPITHECUS.*

Simopithecus oswaldi Andrews, 1916.

MATERIAL.

One male skull lacking the mandible and with the basi-occipital region damaged and three incisors missing, otherwise intact.

One fragmentary female skull consisting of the top of the brain case and the greater part of the face, with the dentition complete. The mandible is missing.

One mandible of a juvenile.

DESCRIPTION OF THE MALE SKULL.

The skull is that of a young adult male with the third molars only recently erupted and with the occipital-sphenoid suture not yet closed. The most noticeable features on first examination are the large size and general massiveness, the short face and the extraordinary development of the median crest which is more like that on a carnivore such as a hyena than that on any baboon. The zygomatic arches are very massive and the mandible. must have been very large.

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*NOTE.—Andrews placed the genus *Simopithecus* in the family *Cercopithecidae*, Hopwood places it in the family *Cynopithecidae*, while by Elliot's classification it would be in the *Lasiopygidae*.

The malar-maxillary area beneath the orbits is very wide and lacks the canine fossa that is to be seen in baboons of the *Papio* group and to a less extent in those of the genus *Theropithecus* as well. The nasal bones are very flat and are also short compared to those of *Papio*. The frontal constriction is very extreme and the temporal crests unite to form the massive median crest on the frontal bone itself just in front of the bregma. The occipital crest is so pronounced that it forms a flange of thin bone about 10 mm. wide and 3.5 mm. thick from just behind one mastoid right round the back of the skull to just behind the other mastoid.

The teeth are large, the molars, in particular, being long and narrow when compared with those of *Papio*, and somewhat resembling those of *Theropithecus* in this respect. The upper canines are much shorter than those of either *Papio* or *Theropithecus* of corresponding age and sex.

The following are the detailed measurements of the skull: —

Maximum length (from centre point of occipital crest to alveolar point between central incisors)	207 mm.
Brain case length (from centre of occipital crest to mid-point of supra-orbital ridge)	125 mm.
Internal brain case length (length of brain cast) ...	93 mm.
Width of brain case (width measured just above the external auditory meatus)	98.5 mm.
Internal brain case width (width of brain cast) ...	67 mm.
Maximum bi-zygomatic breadth	133 mm.
Width at narrowest part of brain case (post-orbital constriction)	47.5 mm.
Maximum frontal width (from mid-point of one malar-frontal suture to mid-point of the other)	86 mm.
Facial length (from nasion to alveolar point) ...	107.5 mm.
Length of nasal bones	58 mm.
Facial breadth (from point where the malar-maxillary suture crosses the inferior margin of the jugal on one side to the same point on the other side)	77.5 mm.
Maximum width of the muzzle above the canines	50 mm.
Maximum width of muzzle above the third molars	62.5 mm.
Minimum malar-maxillary width	37 mm.
Length of molar series	49.5 mm.
Length of molar-pre-molar series	65.5 mm.
Width of palate at mid-point of second molars ...	31 mm.
Width of palate at third pre-molar	28 mm.
Average height of median crest	10 mm.

Measurements of teeth:

Third pre-molar ...	length 8 mm.,	breadth 9.5 mm.
Fourth pre-molar ...	length 9.5 mm.,	breadth 9.5 mm.
First molar ...	length 14 mm.,	breadth 12.5 mm.
Second molar ...	length 18 mm.,	breadth 13.5 mm.
Third molar ...	length 19 mm.,	breadth 14 mm.

DESCRIPTION OF THE FEMALE SKULL.

The skull is that of a young, adult female with the third molars only recently erupted and just coming into wear. When found it was in many fragments; but when these were fitted together it was found that the greater part of the top of the skull, the right side of the face, part of the left malar and zygomatic arch and all the teeth were present. It was, therefore, possible to make a reasonably accurate reconstruction. As, however, there is an almost complete skull of a female in the 1935 collection which is now in the South Kensington Museum of Natural History, this new female skull is not of such great importance as that of the male.

Like the male, the female has a short face and a comparatively long brain-case. The face too lacks a canine fossa, a feature which Andrews also noted in the female on which he based his new genus. The post-orbital constriction is very marked. Unlike the male there is no median crest and the occipital crest is very small.

As this skull is incomplete only a few of the measurements that have been given for the male can be given, they are as follows: —

Maximum length ...	166.5 mm.?
Brain-case length ...	114 mm.
Maximum bi-zygomatic breadth ...	109 mm.
Post-orbital constriction ...	39 mm.
Maximum frontal width ...	73.5 mm.
Facial length ...	76 mm.?
Facial breadth ...	84 mm.?
Minimum malar-maxillary width ...	31 mm.
Length of molar series ...	44 mm.
Length of molar-pre-molar series ...	51.5 mm.

Measurements of teeth:

Third pre-molar ...	length 7.5 mm.,	breadth 8.5 mm.
Fourth pre-molar ...	length 7.5 mm.,	breadth 9 mm.
First molar ...	length 13.5 mm.,	breadth 10 mm.
Second molar ...	length 15.5 mm.,	breadth 12 mm.
Third molar ...	length 16.5 mm.,	breadth 12 mm.

In the male the only incisor tooth preserved is the right lateral and as it is somewhat damaged it is not clear whether its apparent very small size is real or due to damage. The incisor teeth of the female are in perfect preservation, however, and with them it is possible to say with certainty that they are very much smaller than the incisors of a female *Papio* of smaller gross size. The relatively small size of the incisors of *Simopithecus* in both sexes would, therefore, seem to be established beyond doubt.

Description of the Juvenile Mandible.

This mandible is nearly complete, but lacks the left coronoid and the right condyle and coronoid. There is one deciduous tooth present, the right milk molar which is in process of being displaced by the fourth pre-molar. The permanent first and second molars are present, the latter only just erupted and not yet begun to wear. The third molar on the left side has been removed from its crypt for examination, the right, third molar is still in the crypt. The jaw is clearly that of a young female as the canines are very small.

A remarkable feature is the very narrow anterior region of the mandible, a feature presumably linked with youth. The corpus of the mandible is exceedingly massive, far more so than in a *Papio* of comparable age.

Another remarkable feature of the mandible is one on which Andrews commented in his paper in 1916, namely, the great length of the symphysis which terminates at about the level of the posterior edge of the fourth pre-molars.

The following are the principal measurements of the mandible:—

Length of symphysis	36 mm.
Length from incisor border to back of condyle ...	107 mm.
Depth of horizontal ramus beneath first molar ...	21 mm.
Thickness of horizontal ramus at second molar ...	16 mm.
Thickness of horizontal ramus at first molar ...	12 mm.
Width of mandible at second molars (from outer edge of one second molar to other)	44 mm.
Width of mandible at canines (from outer edge of socket on one side to other)	22.5 mm.

Measurements of teeth:

Third pre-molar ...	length 8 mm.,	width 6 mm.
Fourth pre-molar ...	length 9 mm.,	width 7 mm.
First molar ...	length 13 mm.,	width 9.5 mm.
Second molar ...	length 16 mm.,	width 11.5 mm.
Third molar ...	length 17.5 mm.,	width 11 mm.

The canines which being of a female are very small, measure 9 mm. long and 5.5 mm. wide measured at the alveolar margin. They are 9.5 mm. high from alveolar margin to top.

The incisors are very small, the breadth of the laterals being only 4.5 mm. and of the centrals 5 mm., compared with measurements of 6 mm. and 7 mm. respectively, in a *Papio* of the same size.

CONCLUSIONS.

The new material described above provides ample justification for Andrew's creation of a new genus and it would seem to confirm that *Simopithecus* stands nearer to the genus *Theropithecus* than to *Papio*. In the absence of satisfactory comparative material of *Theropithecus,* it is not proposed to discuss the resemblances and divergencies at this time, that such exist is, however, clear.

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NEW FOSSIL SUIDAE FROM SHUNGURA, OMO.

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(PUBLISHED BY PERMISSION OF THE MUSEUM TRUSTEES.)

Introduction.

The fossil beds on the banks of the Omo River in Southern Abyssinia were first discovered by the French Expedition led by Count Bourg de Bozas in 1902, and an account of some of the fossils collected by this Expedition was given by Haug in his Traitée de Geologie in 1912.

A reference in the *Field* of December 6th, 1902, says—*inter alia:*—

> "Among the finds unearthed, Dr. Brumpt identified the remains of elephants, crocodiles, many large fish, three different kinds of horse, many hippos, five kinds of pigs, and eighteen specimens of antelope. There were also some undoubted flint chippings, the remains of pre-historic workers, so that the discovery is one of the greatest importance."

In 1932, another French Expedition led by the palaeontologist, Professor Arambourg, revisited the Omo fossil beds and made extensive collections which were taken to Paris. A popular account of the Expedition was written and published by Dr. Jeannel at the end of 1934, and a certain number of scientific papers have since been published giving some of the results of the work done on the collections, but so far as I can ascertain, no paper describing any of the fossil pigs from Omo has appeared.

As a result of the war, it seems unlikely that any further publications can be expected from Paris on the subject of the Omo fossils for some time and it has, therefore, been decided that a description of the fossils from this very interesting locality that are in the Coryndon Museum should be published without further delay, so as to make them available to other palaeontologists working on African fossils.

During 1941, the Coryndon Museum, Nairobi, received from the Omo Valley several small collections of fossils which had been made by Lieut. J. Smuts, Col. Lynn Allen, Mr. James

Scott, and others, whose duties took them to this area. Early in 1942, an opportunity arose, due to the kindness of Major Gregory-Smith and Capt. Jackson, to send a trained collector to Shungura in the Omo Valley. The collector was only able to spend about three weeks at the sites, but during that time, he collected fourteen cases of specimens. Among them are many of great interest and the present paper is the first of several in which this material will be described.

Such evidence as is available suggests that the Omo fossil beds are older than those at Oldoway and that they are probably of Lower Pleistocene age. They are provisionally regarded as being contemporary with the Kaiso beds of Uganda and the Kanam beds of Kenya.

The term Pleistocene is used in the sense defined by Haug in 1912, and since adopted by Leakey, Hopwood, Patterson, and others, as being more satisfactory than any other, when widespread correlations are involved. The definition lays down that if representatives of any of the genera *Elephas, Equus* or *Bos* occur in a deposit, then that deposit should be regarded as Pleistocene, rather than Pliocene. As a result of using this definition, many deposits that were formerly classified as Upper Pliocene become Lower Pleistocene, and deposits formerly placed in the Lower Pleistocene, become Middle Pleistocene.

In terms of some of the older definitions, Oldoway would have been regarded as Lower Pleistocene and Omo as Upper Pliocene, but we prefer to regard the Oldoway fauna as representing that of the Middle Pleistocene and that of Omo and Kaiso as Lower Pleistocene.

As might be expected, some of the fossils of the Omo series represent species which also occur in the Oldoway fauna, but the available evidence indicates that the Omo fauna includes a fair proportion of species that did not survive into the Middle Pleistocene as represented by the faunas of Oldoway, Kanjera, and other deposits of that period in East Africa.

The known fauna of Omo includes *Deinotherium bozasi, Elephas antiquus, Archidiskodon* sp., *Hipparion* sp., and the extinct pigmy hippopotamus first found at Kaiso, *Hippopotamus kaisensis.*

The Omo fossil pigs are of special interest, because they include forms which indicate the stages through which some of the later Middle Pleistocene species may have passed in the course of evolution. Two new genera are described, as well as a new species of the genus *Mesochoerus.*

FAMILY *SUIDAE*.

GENUS **GERONTOCHOERUS** gen. nov.

DIAGNOSIS.

Suidae with high-crowned and long-rooted third molars composed of four or more pairs of pillars and a small talon. The line of demarcation between crowns and roots very clearly differentiated. Upper third molars more complex than lower.

Gerontochoerus scotti sp. nov. (Genotype).

DIAGNOSIS.

A *Gerontochoerus* of very large size in which the enamel pattern of the third molars exhibits an extreme degree of folding. In the upper third molars, the lateral pillars of each pair are separated from each other by median pillars except in the case of the anterior pair of pillars, but in the lower third molars, the enamel of the lateral pillars comprising each pair touches along the median line and the median pillars merely separate each pair from the next succeeding pair.

MATERIAL.

One maxilla fragment with second and third molars, four incomplete upper third molars, one mandible fragment with second and third molars and five incomplete lower third molars.

Syntypes (*A*): A right maxilla fragment containing an incomplete upper second molar and a complete upper third molar, catalogued as Omo 1 in the fossil collection of the Coryndon Museum, Nairobi. Collected at Shungura, Omo in January, 1942.

(*B*): A left mandible fragment containing the second and third lower molars, catalogued as Omo 2 in the fossil collection of the Coryndon Museum, Nairobi. Collected at Shungura, Omo, in January, 1942.

Description of the first Syntype: This fragment of right maxilla with the whole of the third molar and the greater part of the second has been largely cleaned in order to expose the roots sufficiently to ascertain their nature. The specimen now consists of little more than the teeth held in position by a few small fragments of maxillary bone. The third molar, as the more important tooth is described first.

The third molar was not fully erupted and the posterior end is not fully developed. There are five pairs of lateral pillars behind which are two undeveloped pillars than can either be regarded as a talon or as the beginnings of a sixth pair of pillars. That the latter is the more probable explanation is indicated by

another specimen in the collection, where, in a tooth in full wear, the posterior end does not conclude in a talon, but in a pair of lateral pillars.

The lingual and buccal pillars of the anterior pair touch each other along the median line of the tooth, but the buccal pillars of the second, third, and fourth pairs, are separated from the corresponding lingual pillars by a row of median pillars, of which there are six. In front of the anterior pair of pillars there must have been a whole row of small pillars, but with advancing wear, the enamel of these has fused with that of the lingual pillar of the anterior pair to form a complex pattern (see fig. 4). The enamel pattern of the lateral pillars is very distinctive in this species and is constant in all the specimens in the collection. It consists of a sort of dumbell figure distorted by pressure from end to end and lying transversely across the tooth (see fig. 4).

Each pair of pillars is furnished with long roots, the roots of the anterior pair being the longest. Owing to the fact that the tooth is not in full wear, it is possible to see that the crown was a high one. The fifth pair of pillars were only just coming into wear and the height of the crown at this point is 50 mm.

The following are the full measurements of the upper right third molar of the first *syntype*.

Maximum length 83 mm. Length of occlusal surface (the first five pairs of pillars which are in wear) 76 mm. Maximum width of first pair of pillars 30 mm. Width of occlusal surface at first pair of pillars 23 mm. Maximum width at fourth pair of pillars 28 mm. Width of occlusal surface at fourth pair of pillars 20 mm.

	Height of crown.	Length of roots.
First pair of pillars ...	22.5 mm.	39 mm.
Second pair of pillars ...	26.5 mm.	47 mm.
Third pair of pillars ...	39 mm.	40 mm.
Fourth pair of pillars ...	42 mm.	35 mm.
Fifth pair of pillars ...	50 mm.	22 mm.

The second molar is not complete and the anterior portion including the greater part of the first pair of pillars is broken away. This tooth was, moreover, in an advanced state of wear, the posterior portion being more worn than the anterior part. Before it was broken it is estimated that the second molar was 30 mm. long, as preserved it is 22 mm. long. The enamel pattern of this very worn tooth is seen in the figure. When less worn and complete, it probably had two pairs of lateral pillars and a single median pillar. The posterior roots of the second molar are 22.5 mm. long.

Description of the Second Syntype.

This is a fragment of a left side of a mandible containing the second and third molars. The second molar exhibits an extreme degree of wear, the crown having been worn right down to its junction with the roots. The third molar, on the other hand, was not fully developed and the posterior portion was not yet erupted, although the anterior part is considerably worn.

The second molar is so worn that only the minutest traces of the enamel remain. As preserved, the tooth is 28 mm. long, 19 mm. wide, and the roots are 22 mm. long.

The third molar is composed of six pairs of pillars, of which the first four are in full wear and the last are not yet fully developed. Behind the undeveloped sixth pair is a further rudimentary pair that might perhaps have eventually grown into a seventh pair.

In this lower third molar, as in all other lower third molar fragments in the material which is assignable to this species, the buccal and lingual pillars which comprise each pair touch along the median line. Each pair is, on the other hand, separated from the next succeeding pair by a median pillar. In the anterior pair of pillars, the process of wear has resulted in the enamel of the lateral pillars joining up with that of the minor pillars that, in less worn teeth, lie in front of the anterior pair (see fig. 5). The enamel pattern of the individual pillars in this tooth is a slightly more complex variation of the compressed dumbell figure than in the first *syntype*, but is basically the same.

The part of the mandible that contains the roots is considerably damaged, so that the roots cannot be studied so well as in the type, but each pair of pillars seems to have been furnished with two roots although it is possible that the roots of the fourth, fifth, and sixth pairs were fused into a single element. The full measurements of the tooth are as follows:—

Maximum length 82 mm. Length of the worn part of the occlusal surface 73 mm. Maximum width at the first pair of pillars 24 mm. Width of occlusal surface at first pair of pillars 21 mm. Maximum width at fourth pair of pillars 22 mm. Width of occlusal surface at fourth pair 17 mm.

	Height of crown (worn).	Length of roots.
First pair of pillars ...	14 mm.	30 mm.
Second pair of pillars ...	17 mm.	32 mm.
Third pair of pillars ...	22 mm.	—
Fourth pair of pillars ...	28 mm.	19 mm.
Fifth pair of pillars ...	32 mm.	—

Additional Material.

In addition to the two *syntypes,* we are fortunate in having a number of other specimens representing the same species, although all of them are incomplete. They indicate, however, the constancy of certain features which have been regarded as typical for the species.

A specimen marked Omo 3 in the Coryndon Museum collection.

This is a fragment of upper third molar with three and a half pairs of lateral pillars intact. The fragment has the whole root area broken away. The anterior half of the tooth is missing as well as the extreme posterior section. As in the first *syntype,* the lingual and buccal pillars of each pair are separated by median pillars, a feature which seems to distinguish upper third molars from lower. The crown of the tooth is high, the height of the preserved pillars being from front to back 44 mm., 50 mm., 52 mm., and 56 mm. The maximum width of the fragment is 27 mm., and the occlusal width is 22 mm. The length of the fragment (three and a half pairs of pillars) is 47 mm. The tooth represented by this fragment was only just coming into wear.

A specimen marked Omo 4 in the Coryndon Museum collection.

This is a small fragment of a very worn upper third molar with the root area as well as the anterior and posterior portions broken away. The lingual and buccal pillars of the pairs were separated from each other by a line of median pillars. The crown is only 24 mm. high at its highest. The width, both maximum and occlusal, is 29 mm. The enamel pattern does not differ significantly from that in the first *syntype* (see fig. 8A).

A specimen marked Omo 5 in the Coryndon Museum collection.

This is a fragment of an unerupted upper third molar. The root area is broken away and the pillars are not fully developed. The average height of the pillars is 40 mm. Width 24 mm.

A specimen marked Omo 6 in the Coryndon Museum collection.

This is a fragment of an unerupted upper third molar with the root area broken away. The average height of the pillars is 38 mm. The width is 24 mm.

A specimen marked Omo 7 in the Coryndon Museum collection.

This is a fragment of the left side of a mandible containing the posterior half of the third molar in full wear. The tooth when complete probably had six or possibly even seven pairs of pillars. The preserved portion has four and a half pairs of pillars; the posterior two pairs are small but well-formed. As preserved, the fragment is 57 mm. long and it is estimated that it was originally not less than 90 mm. long. This figure is

estimated by comparison with the second *syntype*, the posterior portion of which is not fully developed. The maximum width of the fragment is 25 mm. and the occlusal width is 21 mm. As in the second *syntype*, the lingual and buccal pillars of each pair touch along the median line, while each pair is separated from the next by a single median pillar, except for the posterior two pairs, which are not so separated. The height of the crown in this worn specimen averages 26 mm. The roots have not been cleared of bone, so the root length cannot be given (fig. 8c).

A specimen marked Omo 8 in the Coryndon Museum collection.

This specimen is the anterior half of a lower third molar which was only just coming into wear. It is composed of four pairs of pillars, the anterior two pairs showing just the beginnings of wear. As in the second *syntype*, the enamel of the buccal and lingual pillars, comprising each pair, touches along the median line, and each pair is separated from the next succeeding pair by a single median pillar. In this little-worn specimen, it is possible to see clearly the group of small pillars in front of the anterior pair, as they have not yet fused with the enamel of the anterior pair.

The fragment has all the roots broken away. The height of the pillars of the preserved portion of the tooth is: first pair 31 mm., second pair 34 mm., third and fourth pairs 38 mm. The length of the four pillars preserved is 67 mm. The maximum width of the first pair of pillars is 23 mm. and the occlusal width is 17 mm. The enamel pattern is not clearly developed, owing to the very slight wear.

A specimen marked Omo 9 in the Coryndon Museum collection.

This is a fragment of lower third molar lacking the anterior and posterior ends. As preserved, it consists of three and a half pairs of pillars with the root area broken away. As in the second *syntype*, the enamel of the lingual and buccal pillars of each pair touches along the median line, while each pair is separated from the next succeeding pair by a single median pillar. The length of the three and a half pairs of pillars preserved is 50 mm. The maximum width is 24 mm. and the occlusal width is 20.5 mm. The heights of the pillars that are preserved are 28 mm., 30 mm., 33 mm., and 36 mm. The enamel pattern is typical (see fig. 8B).

A specimen marked Omo 10 in the Coryndon Museum collection.

This is a fragment of the posterior end of a lower, third molar. It is water-rolled and much damaged, and lacks the roots. Three and a half pairs of pillars are preserved, the two posterior ones of which are not fully developed. The heights of the pillars are 37 mm., 43 mm., and the last two 46 mm. each.

A specimen marked Omo 11 in the Coryndon Museum collection.

This specimen is the anterior portion of a lower, third molar with the anterior pair of pillars and half the second pair preserved. The roots are broken away. The height of the crown at the first pair of pillars is 36 mm. The occlusal width is 19 mm.

EXPLANATION OF THE NAME.

The generic name is from the Greek words *Gerons* and *Choerus*. The species is named *scotti*, after Mr. James Scott, who brought the first recognisable specimen of this species to the Museum. This is the specimen marked Omo 9.

DISCUSSION.

This new genus of *Suidae* to which the name *Gerontochoerus* has been given, is of special interest, because it exhibits a combination of characters that rather suggest that it represents a stage from which a number of other, later genera may have been evolved. It is NOT suggested that this Lower Pleistocene pig is the actual ancestor of the later pigs, but rather that it is a persistance of a type of Pliocene pig which might very well have been ancestral to a number of other genera.

The high crowns of the third molars suggest affinities with *Notochoerus, Metridiochoerus* and even *Phacochoerus,* but the nature of the roots does not allow this comparison to be carried very far. The root form suggests affinities with *Hylochoerus, Potamochoerus,* and *Sus. Mesochoerus,* as the name implies, stands intermediate between these two groups, both in root form and in the height of the crown and the arrangement of the pillars. In the arrangement of the pillars, the genus *Gerontochoerus* stands closest to *Notochoerus,* but also has characters that are reminiscent of *Hylochoerus*. This similarity is greatest when comparison is made with the extinct *Hylochoerus euilus,* which, however, differs from *Gerontochoerus* in having crowns of medium height and fewer cusps and a marked talon.

In the large number of pairs of lateral pillars (six to eight) of the third molars, *Gerontochoerus* has a character which suggests affinities with *Phacochoerus,** and if the only material had been teeth with the roots broken away, then the very high crowns might well have led to closer comparison with the genus *Phacochoerus* or possibly with *Notochoerus*.

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*NOTE.—In both syntypes the second molars are worn to an extreme degree while the third molars are not fully developed. This suggests that in old animals in which third molars are in full wear it will be found that all the other check teeth have been lost as is commonly the case in *Phacochoerus*.

From this brief summary of the resemblances and differences which the new genus shows when compared with known genera, it will be seen that we are indeed dealing with a genus of special interest in the study of African pigs.

GENUS **PRO-NOTOCHOERUS** gen. nov.

DIAGNOSIS.

Medium-sized *Suidae* with long-rooted, medium high-crowned third molars. The crown not clearly differentiated from the roots.

Pro-notochoerus jacksoni sp. nov. (Genotype).

DIAGNOSIS.

A *Pro-notochoerus* about the size of the present-day wart-hogs with a lower third molar composed of three pairs of pillars and a very small talon. Roots longer and crowns lower than in any known *Notochoerus* to which the new genus has certain marked resemblances in other respects.

Type: A lower, left, third molar in a fragment of mandible, catalogued as Omo 12 in the fossil collection in the Coryndon Museum, Nairobi. (See Plate 18.)

Paratype: A damaged mandible fragment with damaged third and second molars, catalogued as Omo 13 in the Coryndon Museum collection.

Description of Type: When collected, this specimen consisted of a left mandible fragment with the third molar in position. In order to study the root formation, the whole of the bone has been cleared away and the roots fully exposed. The anterior root on the buccal aspect was already broken away when the specimen was found. Apart from this and very minor damage to the enamel of the second pillar on the lingual side, the tooth is perfect. It was in full wear and even the talonid had just begun to come into occlusion. The tooth is composed of three pairs of pillars and posteriorly there is a small talonid. The pillars of the anterior pair touch each other along the median line. Between the anterior pillars and the second pair there has been a median pillar, but owing to the stage of wear, the enamel of this median pillar has joined up with that of the buccal pillar of the second pair. Between the second and third pairs of pillars, there are two median pillars. The enamel of the two pillars comprising the third pair just fails to meet in the median line, and behind the third pair of pillars and separating it from the talonid, is another median pillar.

The measurements of the tooth are follows: Maximum length 53 mm. Occlusal length 47 mm. Maximum width of

crown 21.5 mm. Width of occlusal surface at first pair of pillars 16.5 mm. Width of occlusal surface at third pair of pillars 16 mm. Height of crown at first pair of pillars 20.5 mm. Length of root of the first pair of pillars 34 mm. Height of crown at second pair of pillars 25 mm. Length of roots of the second pair of pillars 37 mm. Height of crown at third pair of pillars 24 mm. Length of the root of the third pair of pillars and talonid combined 37 mm. (*Note.*—Owing to the way that the crown and root area is not clearly differentiated it is not easy to decide just where the crown ends and the root begins.)

The roots are strongly developed. The first and second pairs of pillars each had two, long and well-defined roots, while the roots of the third pair of pillars and of the talonid were fused to form a single flat and compact root.

Description of Paratype: This is a fragment of mandible (right side) containing the second and third molars and a broken part of the first molar, as well as the root sockets of the fourth pre-molar. The third molar had not come into full wear. The whole specimen is somewhat abraded and the occlusal surfaces of the teeth, in particular, are damaged. For this reason, the specimen was not chosen as *type* but only as *paratype*. Its importance lies in the fact that it shows (1) the height of the crown in a tooth that is practically unworn, (2) that it shows the roots of the third molars are fully developed in this species, even when the posterior end of the tooth is not yet in wear, and (3) it enables us to learn something of the second and third molars.

As in the *holotype,* the third lower molar is composed of three pairs of lateral pillars behind which is a median pillar and then a talonid composed of three small pillars set transversely across the end of the tooth.

The roots are as in the *type*. The following are the measurements of the third molar, set out in comparison with those of the type:—

Type: (Somewhat worn.) Maximum length 53 mm. Occlusal length 47 mm. Maximum width 21.5 mm. Occlusal width 16.5 mm.

Paratype: (Slightly worn anteriorly.) Maximum length 55 mm. Occlusal length 47.5 mm. Maximum width 20 mm. Occlusal width 16.5 mm.

Type: Height of crown at first pillar 20.5 mm., at second pillar 25 mm.

Paratype: Height of crown at first pillar 30 mm., at second pillar 33 mm.

Type: Height of crown at third pillar 24 mm. Length of roots: first 34 mm., second 37 mm., third 37 mm.

Paratype: Height of crown at third pillar 35 mm. Length of roots: first 26 mm., second 27.5 mm., third 21 mm.

The second molar has an occlusal and maximum length of 28 mm., and a maximum width of 17 mm. Occlusal width 14 mm. The enamel pattern is complex and hard to trace owing to the abrasion of the surface. The tooth is considerably worn and the crown of the anterior part is 12 mm. high. The tooth has long roots.

The third molar is too broken for description, but was about 17 mm. long.

Additional Material: The crown of an upper, third molar with the root area broken away is provisionally placed with this species. It was not fully developed and only the first pair of pillars had come into wear. It is 56 mm. long and has a maximum width of 25 mm. The height of the crown at the anterior pillars is 31 mm. and at the second pillars 35.5 mm. The third pair of pillars and the talonid were not fully developed.

The specimen is marked Omo 14 in the collections in the Coryndon Museum.

EXPLANATION OF THE NAME.

The generic name was chosen to indicate that we seem to be dealing with a pig representing a form from which *Notochoerus* may have been derived. The specific name is in honour of Capt. Jackson who gave valuable help to my collectors when they went to Omo.

DISCUSSION.

The new genus differs from *Notochoerus* in having long well-developed roots to the third molars. These roots are fully formed and closed even when the posterior part of the tooth is as yet not fully developed. All three specimens known—two lower, third molars and one upper, third molar—have only three pairs of lateral pillars and a very short talonid. The arrangement of the lateral and median pillars and the nature of the enamel pattern recalls *Notochoerus* and it is suggested that the new genus represents a definite ancestral form.

GENUS *MESOCHOERUS* Shaw and Cooke.

Mesochoerus heseloni sp. nov.

DIAGNOSIS.

A small *Mesochoerus* with third molars that are very low-crowned in comparison with either of the previously described species, *paiceae* or *olduvaiensis*. Roots of molars longer than height of crowns.

MATERIAL.

Seven mandibular fragments with teeth, two maxilla fragments with teeth and a number of broken teeth.

Syntypes (*A*): A fragment of the left side of a mandible containing the third and fourth premolars and all three molars. This specimen is marked Omo 15 in the fossil collection in the Coryndon Museum.

(*B*): A left mandibular fragment with the roots of the fourth premolar and the first, second, and third molars in position. This specimen is marked Omo 16 in the fossil collection in the Coryndon Museum.

(*C*): A fragment of maxilla with part of the second molar and the third molar in position. This specimen is marked Omo 17 in the fossil collection in the Coryndon Museum.

Description of the first Syntype: This mandibular fragment is very well-preserved. The only tooth that is not in perfect condition is the fourth premolar, which has the posterior cusp broken.

The first molar is in an advanced stage of wear; the second molar is in full, but not advanced wear, while the third molar was not fully erupted and its posterior end not fully developed.

The third premolar of this genus has not previously been described. In this species *heseloni,* it is seen to resemble the corresponding tooth in the genus *Sus* more than that in the genus *Potamochoerus.* It is entirely unlike the third premolar of the genus *Hylochoerus,* in which the third premolar is poorly developed and is shed in early life.

The third premolar is much more robust than those of either *Sus* or *Potamochoerus* available for comparison. It measures 15 mm. long and 10 mm. wide, compared with figures of 12 mm. and 7 mm. for the largest *Potamochoerus* lower, third premolar available. The crown is 11.5 mm. high in a tooth which is only very slightly worn, compared with 8.5 mm. in a *Potamochoerus* tooth in the same stage of wear. *Sus* third premolars available are even smaller than in *Potamochoerus.*

The fourth premolar bears a very marked resemblance to that of the genus *Potamochoerus* and differs greatly from the corresponding tooth in *Hylochoerus.* It is, however, much more robust than the largest, lower, fourth premolar of *Potamochoerus* that is available for comparison. Judged by a photograph of *Mesochoerus paiceae* kindly supplied by Dr. Cooke, the fourth premolar of that species is more molariform than the species now being described.

The measurements of the present specimen are: Length 17.5 mm. Width 14 mm. Height 16 mm. The corresponding figures for the largest available fourth premolar of *Potamochoerus* are 16 mm., 12 mm., and 12 mm.

The first molar is in an advanced stage of wear and only the outer line of enamel left, the whole of the centre of the tooth being worn down to the dentine. The tooth is similar in general characters to the corresponding tooth of *Potamochoerus*. It is, however, larger. The measurements are: Length 20 mm. Width 14 mm. The highest part of what is left of the crown is 3 mm.

The corresponding length in the largest *Potamochoerus* available is 16 mm. and width 11 mm.

The second molar is in full wear and in ideal condition for study. It is composed of two pairs of pillars separated by two smaller, median pillars and with a distinct talonid both anteriorly and posteriorly. It exhibits certain resemblances to the corresponding teeth of both *Potamochoerus* and *Sus* but is larger than any in the comparative material available. I can, moreover, find no example of an anterior talonid in the second molars of these genera. The measurements of the tooth are as follows: Length 29.5 mm. (both maximum and occlusal). Maximum width 19.5 mm. Occlusal width 15 mm. Height of crown 13 mm. The corresponding measurements in the largest *Potamochoerus* available are 23 mm., 18 mm., 12 mm., and 10 mm. in a tooth in the same stage of wear.

The third molar is not fully developed or even fully erupted and only the anterior pair of pillars show any wear. This is a fortunate circumstance, as it makes it possible to compare the crown height with that of the fine specimen of *Mesochoerus paiceas* published by Shaw and Cooke and also with the *paratype* of *Mesochoerus olduvaiensis*, which is also practically unworn.

The tooth is composed of four pairs of lateral pillars, and the lingual and buccal pillars of each pair touch along the median line of the tooth. Each pair of pillars is separated from the next succeeding pair by two smaller pillars set in the median line. There is no talonid behind the posterior pair of pillars (but this is not a constant character as is shown by other specimens in the series). There is a talonid in front of the anterior pair of pillars. As the tooth is practically unworn, it is not possible to describe the enamel pattern of this tooth, but from other lower third molars in the series, we know that the enamel of each pillar is considerably folded (see figs. 11 and 13).

The roots have been exposed on one side and they are seen to be long but open at the extreme tips. This is even true of the second molar, although that tooth is in full wear. The roots of the two posterior pairs of pillars were damaged before the specimen was collected, but it would seem that these two pairs of pillars had their roots fused into a single element.

The measurements of this third molar are shown in a table comparing them with the measurements of the *holotype* and *paratype* of *Mesochoerus olduvaiensis* and the unworn third

molar of *Mesochoerus paiceae*, as these measurements show clearly why a new species has been created.

	Max. length.	Occ. width.	Max. width.	Height of crowns of pillars 1st.	2nd.	3rd.	4th.
	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Mesochoerus paiceae ...	68	—	22	34	—	—	31
Mesochoerus olduvaiensis (*holotype*) ...	67.5	17	25	23	24.5	26	26
Mesochoerus olduvaiensis (*paratype*) ...	65	17	24	24.5	24	27	26
Mesochoerus heseloni (*holotype*) ...	49	—	21.5	22	21.5	20	20

Length of roots:	1st pillar.	2nd pillar.	3rd pillar.	4th pillar.
Mesochoerus paiceae ...	11 mm.	—	—	—
Mesochoerus olduvaiensis .	—	—	—	—
Mesochoerus olduvaiensis .	—	—	20 mm.	—
Mesochoerus heseloni ...	29 mm.	26 mm.	—	—

The teeth dealt with above are all lower third molars. Those of *M. paiceae* and *M. heseloni* are unworn, or practically so, and those of *M. olduvaiensis* are only worn in their anterior parts and there only very slightly.

In many respects there is a superficial resemblance between the third molars *Mesochoerus heseloni* and the third molars of *Potamochoerus*, but the resemblance will not bear close examination. In *Potamochoerus*, the lower, third molars have only two pairs of pillars and a talonid and they seldom, if ever, exceed 38 mm. in length.

Description of second Syntype: This is a left mandibular fragment containing the broken roots of the fourth premolar, the first molar in a very damaged condition, the second molar which is in good condition except for the posterior buccal pillar, and the third molar fully erupted and in an early stage of wear.

The premolar and first molar are too damaged to merit description. The second molar differs from the type in having only one median pillar between the two pairs of pillars. Otherwise it does not differ. Its measurements are: Maximum and occlusal length 27 mm. Maximum width 20 mm. Occlusal width 17 mm. Height of crown (which is much worn) 9 mm. Length of roots about 32 mm.

The third molar is composed of four pairs of lateral pillars, the lingual and buccal pillars of each pair touching along the median line. There are two median pillars between the first and second pairs and two between the second and third pairs. The third pair is separated from the fourth by a single median pillar and there is also a median pillar forming a sort of talonid behind the posterior pair of pillars. As in the type, the crown is low and the roots very long. The tooth is only slightly worn and perhaps 5 mm. has been worn away from the surface of the

tooth (not more) anteriorly and less posteriorly. The measurements of the tooth are as follows: Maximum length 55 mm. Occlusal length 48 mm. Maximum width 22 mm. Occlusal width 17 mm. Height of crown at anterior pillars 15 mm. Height of crown at posterior pillars 20 mm. Length of anterior roots 33 mm. Length of posterior roots 21 mm.

Description of third Syntype: This is a fragment of maxilla with a part of a very damaged second molar that was so worn that the whole of the enamel had disappeared, and a third molar in an advanced stage of wear and somewhat damaged. It has been chosen as *syntype* because it is the best specimen in the collection to show the upper dentition and also the nature of the enamel pattern in this species in the final stages of wear.

Nothing can be said about the second molar except that its roots were about 20 mm. long.

The upper third molar was composed of three pairs of pillars instead of the four seen in the lower third molars, but it had a talon of seven smaller pillars in place of the fourth pair, so that the length of the tooth is about the same as in a fully-developed, lower molar. Owing to the advanced wear, the enamel of adjacent pillars has joined up and in fact the enamel of all the three pairs of anterior pillars of the talonid have not been affected by this process, as the talon is not quite so worn as the rest of the crown. The details of the enamel pattern in an unworn upper third molar of this species are not yet known.

The measurements of the tooth are as follows: Maximum length 56.5 mm. Occlusal length 56.5 mm. Maximum width probably 21 mm. Occlusal width probably 21 mm. Length of anterior root 27 mm. Length of posterior root 19 mm.

Additional Material: Two fragmentary right sides of mandibles marked Omo 18 and Omo 19 in the fossil collections of the Coryndon Museum. Both these fragments contain the second and third molars in good preservation and they do not differ in any significant way from the *syntypes*. The measurements are as follows: Second molars—lengths 28 mm. and 30 mm. Maximum widths 18 mm. and 18.5 mm. Occlusal widths 14.5 mm. and 15 mm. Heights of crown 12 mm. each. Third molars—lengths 53 mm. and 56 mm. Occlusal lengths 48 mm. and 51 mm. Maximum widths 19.5 mm. and 21 mm. Occlusal width 14 mm. each. Heights of crowns at first pair of pillars 17.5 mm. and 19 mm. Heights of crowns at fourth pillars 19 mm. each. The roots of these two specimens have not been exposed for measurement.

A right mandibular fragment marked Omo 20 with half the second molar and the third molar in a damaged condition. This specimen does not differ significantly from the other material in the series and is too damaged to be accurately measured.

A fragment of right maxilla containing the second molar, slightly damaged. The specimen is marked Omo 21. The tooth is very like second lower molars in the series and might have been classified as such if the maxillary bone had not been preserved with it.

A talon of an upper third molar marked Omo 22. It consists of the third pair of pillars and the whole of the talon. As in the *syntype,* the talon takes the place of the fourth pair of pillars in the upper third molar.

Explanation of the Name.

The specific name *heseloni* is in honour of Heslon Mukiri the collector.

Discussion.

A new species of the genus *Mesochoerus* has been created for the Omo series, because the third molars of a fairly long series are consistently shorter than those of the two other species *paiceae* and *olduvaiensis* and more important still, because the crowns of the third molars are markedly lower and the roots longer and more developed. The new species shows a certain resemblance to the genus *Potamochoerus* and seem to indicate that the genus *Potamochoerus* is more closely allied to the extinct genus *Mesochoerus* than to any other.

GENUS *SUS* Linné.

Sus limnetes Hopwood.

This species which was originally described by Hopwood from the Kaiso beds in Uganda, which are supposed to be of the same age as the Omo beds, is probably represented in the collection by the crown of an unerupted third upper molar which compares very closely with the type specimen. It is marked Omo 23 in the fossil collections of the Coryndon Museum. It is 50 mm. long and has a maximum width of 23.5 mm. The crown is 21 mm. high at the middle of the tooth (see fig. 14B).

Conclusions.

The Omo *Suidae* are of special interest in that they provide a glimpse of the probable stages through which some of the pigs of the later geological horizons passed. It is not suggested that these Lower Pleistocene *Suidae* are the actual ancestors of later forms but rather that they represent survivals of forms approximating to the ancestral forms just as the very large mastodons and *Deinotherium* that survive into the Pleistocene represent survivals of the Miocene and Pliocene ancestors of some of the elephants.

When the time comes for a detailed review and comparative study of the living and fossil pigs of the African continent to be made, these Omo fossils may be expected to take an important place in that study. The interesting nature of the few specimens available from a bare three weeks' collecting, make it clear that the Omo fossil beds which extend for thirty or forty miles, will well repay very extensive and prolonged study after the war.

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THE INTER-ACTION OF VARIOUS SYSTEMS OF LAW AND CUSTOM IN BRITISH SOMALILAND AND THEIR RELATION WITH SOCIAL LIFE.*

By Captain A. C. A. Wright.

In most primitive societies we find that the social unit is a small one, the extended family, i.e., father, mother, children, and cousins up to the third or fourth degree. The extended family is held together by bonds of economic necessity. A group this size is the optimum unit for maintaining itself under difficult natural conditions particularly with a limited water-supply and sparse grazing. Outside this there is no security. In such societies the system of law is dual; one for regulating actions within the group, which is on an individual basis of reciprocity of gifts and services; the second, for persons outside the extended family, is a pattern of behaviour dependent on the idea that each family acts as one, and has a group identity.

Between these family groups behaviour is regulated on the same idea of reciprocity, good for good, evil for evil; but, while within the family there is always the sanction of expulsion (which is equivalent to death) if a member will not accept the opinion of his family elders as to what is right; outside the family, there is no such sanction. In a wide empty country, where wandering groups are not forced into close contact with one another, this is not serious. Amities and enmities persist for generations, and form a readily understandable pattern, with a system of marriage exchange on one side and murders on the others. As groups develop, it is often inconvenient on economic grounds to remain permanently at enmity, and so a mechanism of settlement develops, which is an attempt to

*This paper is the result of six months' field work from June to December, 1941, occupied chiefly in preliminary enquiries for murder as a result of incidents which occurred at the time of the re-occupation of British Somaliland. Since the greater part of the local records of British Somaliland were destroyed during the evacuation of 1940, the Secretary to the Government, Lt.-Col. R. H. A. Arundell, asked me to collect what information I could about the Somali social organization and digest it into a short paper, which is now published. The paper is intended to be of use in the field to new arrivals in the Somali country who may find the Somali social organization confusing and the Somali individual exasperating. If to understand is to sympathize, it is to be hoped that this will assist a little to a sympathetic administration of this harsh and bitter country. I have been greatly assisted by the kindness of Lt.-Col. R. H. Smith, O.B.E., Major E. Barry, M.B.E., Major A. T. Curle, M.B.E., and Captain E. F. Peck, all of whom have been kind enough to read this paper through in the course of its production and make helpful comments which have been incorporated. Such errors as occur are the author's, not theirs. Some information from a note by Major D. J. C. Walsh, O.B.E., on the history of Boramo district has also been used.

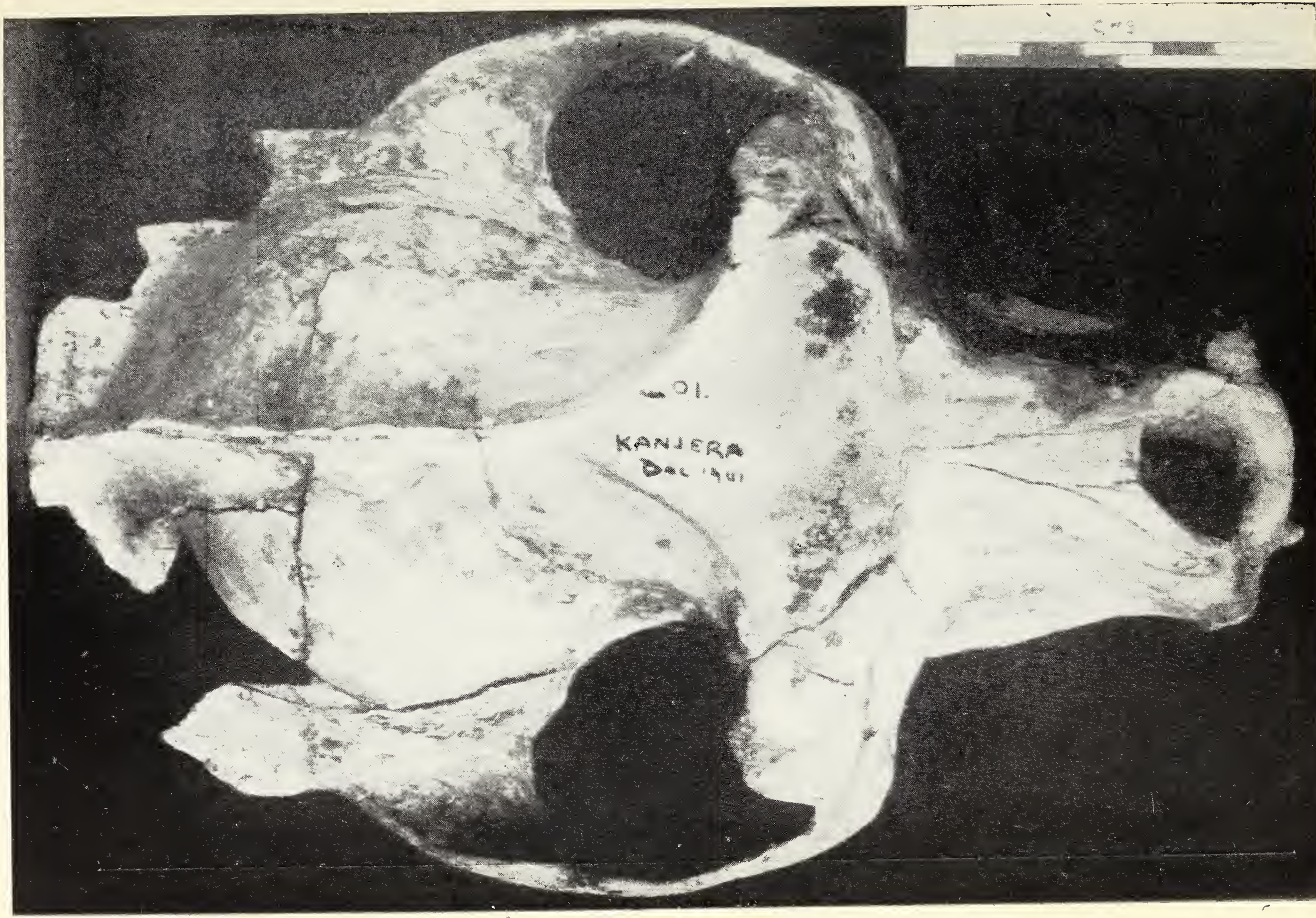
PLATE 9.

Male *Simopithecus oswaldi*, Andrews.

PLATE 10.

Male *Simopithecus oswaldi*, Andrews.

PLATE 11.



Male *Simopithecus oswaldi*, Andrews.

PLATE 12.

Male *Simopithecus oswaldi*, Andrews.

PLATE 13.

Female *Simopithecus oswaldi*, Andrews.

PLATE 14.

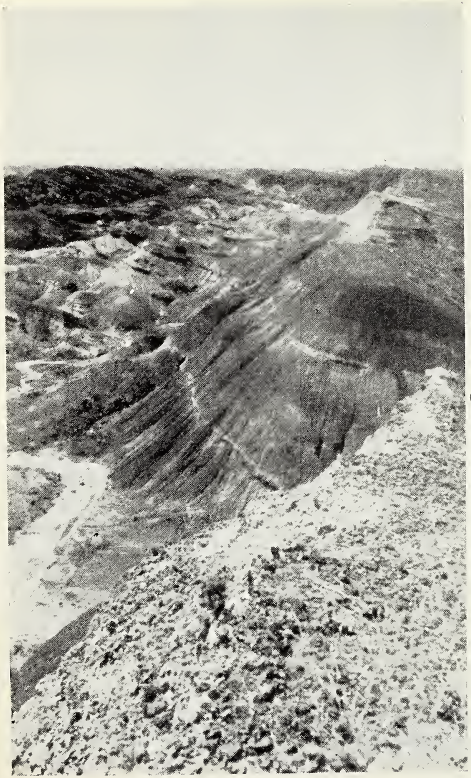


FIG. 1.
Typical view of Omo fossil beds.
PHOTO: CAPT. JACKSON.

FIG. 2.
View of Omo fossil beds to show tilting of beds in certain areas.
PHOTO: CAPT. JACKSON.

FIG. 3.
Another view of Omo fossil beds, showing stratification.
PHOTO: CAPT. JACKSON.

PLATE 15.

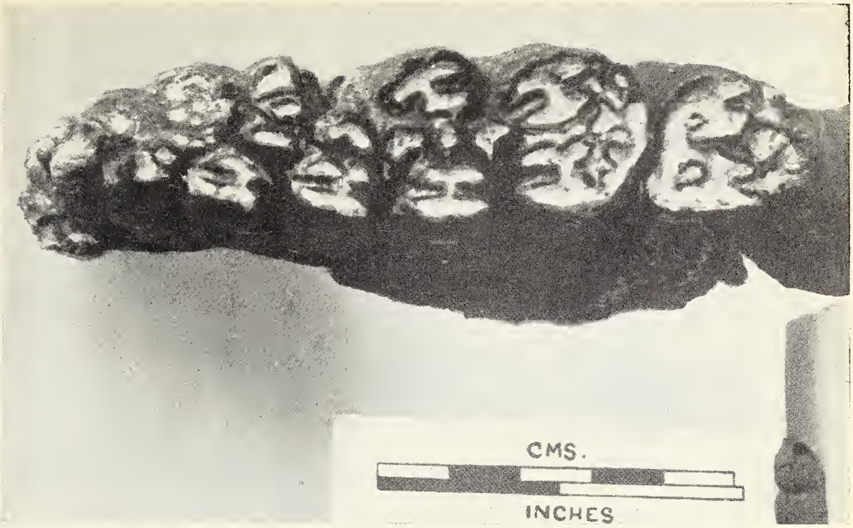


Fig. 4.
First syntype of *Gerontochoerus scotti*, Leakey, gen. et sp.nov. (occlusal view of upper third molar and part of second to show enamel pattern).

Fig. 5.
Second syntype of *Gerontochoerus scotti*, Leakey, gen. et sp.nov. (occlusal view of lower third and second molars).

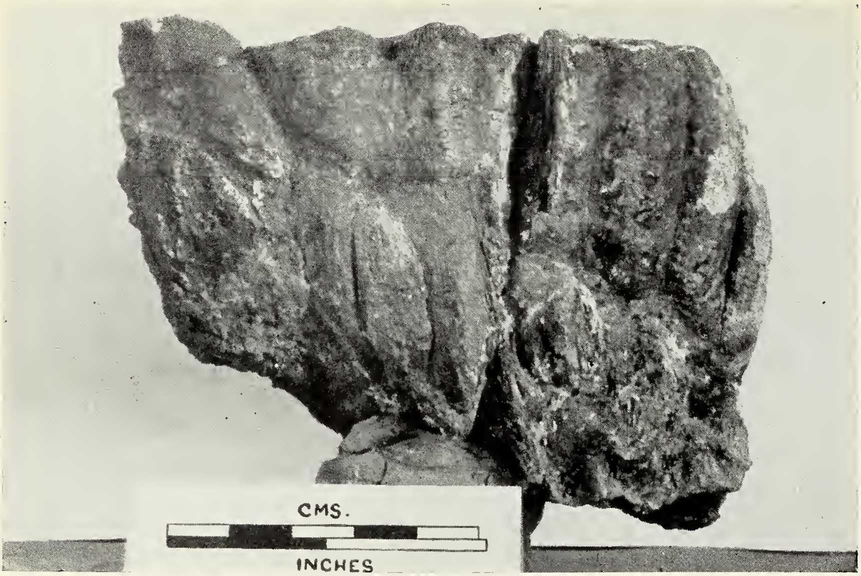
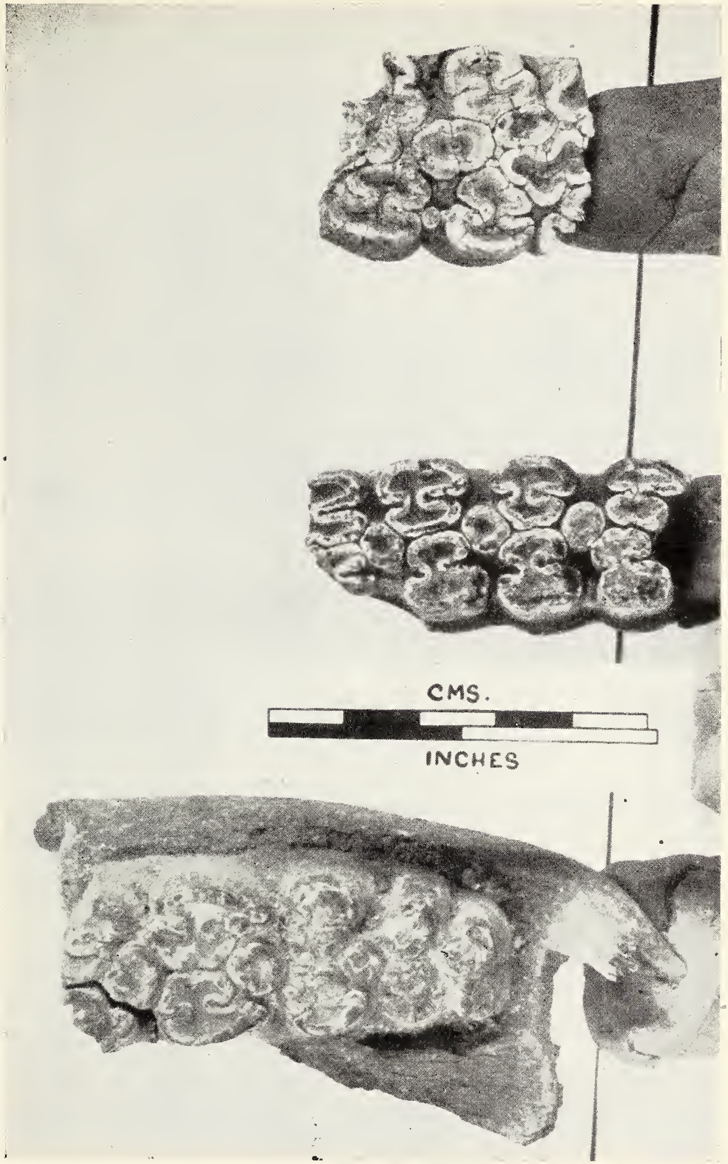


FIG. 6.
First syntype of *Gerontochoerus scotti*, Leakey, gen. et sp.nov.
(side view of upper third molar and part of second molar
to show anterior roots).

FIG. 7.
First syntype of *Gerontochoerus scotti*, Leakey, gen. et sp.nov.
(side view of upper third molar and part of second molar
to show posterior roots).

PLATE 17.



A

B

C

FIG. 8.
Fragments of third molars of *Gerontochoerus scotti*.

PLATE 18.

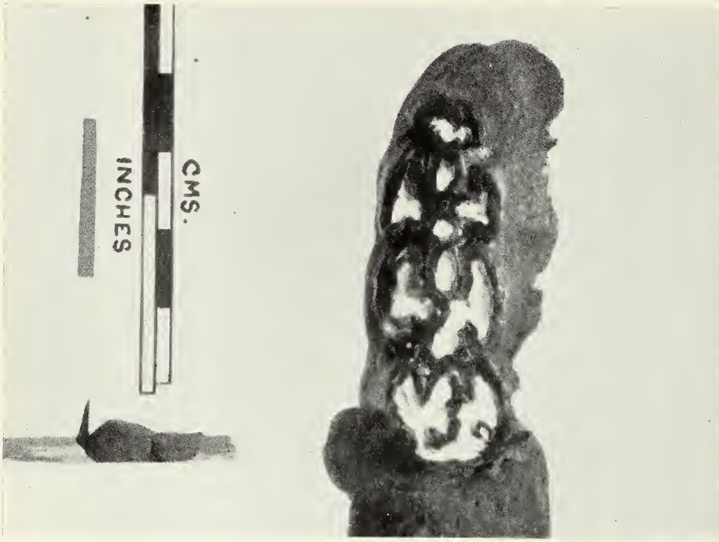


Fig. 9.
Type of *Pro-notochoerus jacksoni*, Leakey, gen. et sp.nov. (occlusal view of lower third molar).

Fig. 10.
Type of *Pro-notochoerus jacksoni*, Leakey, gen. et sp.nov. (side view of lower third molar to show roots).

PLATE 19.

Fig. 11.
First syntype of *Mesochoerus heseloni*, Leakey, sp.nov.
(mandibular fragment).

Fig. 12.
First syntype of *Mesochoerus heseloni*, Leakey, sp.nov.
(side view to show roots).

PLATE 20.

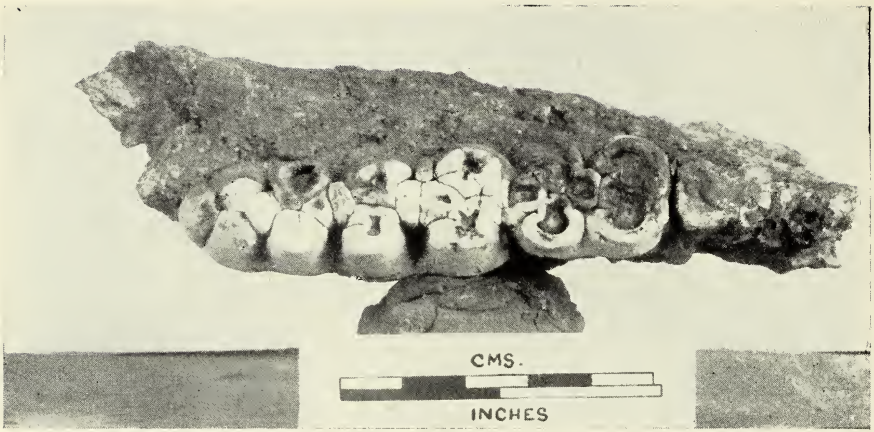


FIG. 13.
Second syntype of *Mesochoerus heseloni*, Leakey, sp.nov. (mandibular fragment).

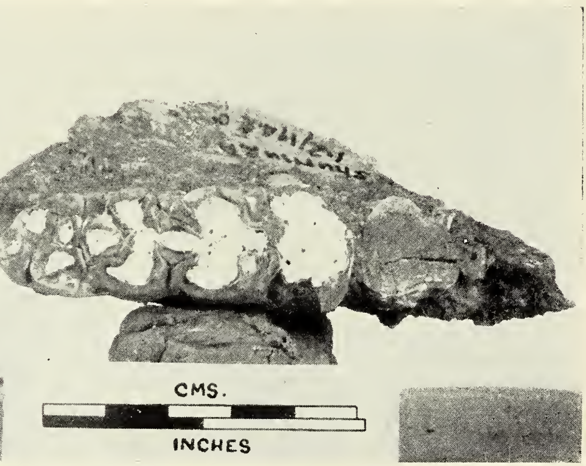


FIG. 14B.
Sus limnetes, Hopwood.

FIG. 14A.
Third syntype of *Mesochoerus heseloni*, Leakey, sp.nov. (upper third molar).

reverse the pattern of behaviour from hostility to friendliness by deliberate action. In such settlements it is usually the function of the "in-laws" to bring the two warring groups into contact. The injured group then announces its losses and the defendant group agrees to compensate. This is done by the most natural method, that is to say, by a transfer of nubile women, whose familial connections may serve later to bring the groups into a relationship of amity, and whose breeding power will compensate the group for the lives of its members previously destroyed. In time the actual exchange of girls becomes an exchange of wealth equivalent to one or more bride prices. (1) The functional value of the peace-making exchange is thereby diminished; but the payment continues as a mixture of punishment and compensation.

This system has definite biological advantages from the point of view of a society existing at a bare subsistence level. The feud, so long as weapons are of a primitive type, leads to the elimination of the less virile males without any serious damage to the family as a whole. At the same time rapid increase, which the country could not support, is prevented by the conditions of chronic desert warfare which puts a very severe strain on the women, who have to bear a large part of the economic burden.(2). Only the most vigorous of both sexes can hope to survive unaided in the seasonal bad years.

Somali society outside the few towns is of this type. Of the Somali as of the Arab it may be truly said that he is a parasite of the camel. Everything in his life is secondary to the welfare of his herds, for without their milk he starves, and lacking their possession he ceases to be a free man. His very name "Somali" is perhaps but a corrupted Arab nickname *"Dhu-mali"* — "owner of wealth," i.e., "stockowner"; but it represents a status of which he is extraordinarily proud.(3) The structure of his nomadic society is of a very ancient pattern; but it has been affected by two important factors; the introduction of Islamic law, and more recently the introduction of European administration with European law, currency and trading methods. The description which follows is based on discussions in the Isahak (Isaak) dialect. For convenience of use in the field these words are collected in the glossary. (*See* page 89).

We find that the sept (*jilib,* lit. "joint") is the fundamental social unit. This is a subdivision of the clan [*qolo* (4)] forming a part of the big patrilineal tribe (*tol*). This sept contains a small group of families (*rero,* lit. "enclosures" or "kraals") who combine to pay and receive blood compensation for acts by, or against their members. The word *hegal* has been used by

(1) Numbers in the text refer to Notes (see p. 84 *et seq.*).

some authorities as being equivalent to the *rer,* i.e., the smallest unit of social extension. I find that it means "relative" and can be used loosely of any near blood relatives on either father's or mother's side. When the sept or *jilib* grows too large for convenient division of profits or responsibilites, a split takes place. The arrangement is confused by the fact that the word *rer* is often used loosely not only for "family," but also for "sept" and even sometimes for the equivalent of *tol,* e.g., the very large group of the *Rer Segulleh* which includes many hundred members. Nevertheless, there can be little doubt the *jilib* is the correct definitive name for the group that combines to pay blood money.

The *jilib* is controlled by the elders sitting in council. *Jilibs* are united by blood, and connected by marriage relationship: or sometimes by treaty alliance for mutual defence. They are normally divided by quarrels between the young men over the following subjects: women, water, grazing, and the concealment of lost stock. As a result of these quarrels fights start, which cause wounding, broken bones, or death. These in turn give rise to hatreds which develop into feuds, which are carried on by a succession of raids with raiding parties. It may be noted that feuds, or at least the general clan jealousies, which at first sight appear to be senseless, seem in the past to have had a real functional value. They made certain that the boundaries of the clan grazing areas were fairly strictly defined and so prevented poaching of grazing, which is causing the present economic ruin of the country by progressive over-grazing, erosion and consequent desiccation of the once fertile "well area," called the Ogo, between the mountains and the flat waterless *Haud.* After a quarrel, offers of a settlement, or demands for compensation are made by the use of an embassy, whose members are, if possible, "in-laws" of both sides,(5) or failing these, old men not closely-related to either party.

The exchange of peace terms is followed by a general peace meeting (6) of both clans concerned. Compensation for wounding commences with the payment of sheep called variously the *budegeyo* (tail-cutting), or the *shashaffo* (fat), as maintenance for the injured till they are fit enough to have their wounds assessed in value. The examination of the stock offered in payment is done by a locally appointed board of elders called a *bash, gudi* or *panch.*(7) Payment is divided within the clan according to two alternative principles:—

(1) *Qoro-leh* (penis possessors) or *Qoro-tirris* (penis count) that is to say all males paying equally, old or young, rich and poor alike.(8)

(2) *Qabno* (wealth in stock) each *jilib* or *rer* paying proportionately to its wealth.

However, the actual details of division differ in every big clan. Customary law is called in Somali *her* and in Arabic *adat* and it undergoes frequent alterations in detail as the result of the decisions of representative clan meetings from time to time (rather as a joint stock company can by consent of its members alter the methods of apportioning profits on its shares). In addition to the private *her* of each clan, there is a more general *her* recognised by usage between clans. It should be emphasised that used in the narrow sense *her* is merely customary assessment, it is not a general "law," i.e., it carries no compulsive force. *Her* can also be used in the sense of a "custom" as applied to habit, or act, commonly observed.

The agreement is that the taking of a man's life, or of his powers of propagation by castration, is worth full compensation of 100 camels. A woman's life is worth 50 camels. These are the flat rates for individuals of each sex irrespective of age, wealth or position. The normal arrangement is that the near relatives (i.e., the *rer* of the person concerned) have a one-third responsibility for his actions. When compensation passes they give or receive 33⅓ camels, as the case may be. If it is for a woman's death, the amount is 17 camels. This special close relative's share is called the *jiffo* and is divided according to the custom accepted by the particular *jilib*. The remaining two-third share which is divided or paid, by the outer ring of cousins is called the *gobane*. A *gudi* assessment is done after a fight by balancing the totals of lives and injuries inflicted, into terms of standard camels and their fractional divisions, which are taken in terms of standard sheep. A *sagali* is a standard male camel worth nine standard female sheep, each standard sheep being worth in theory three rupees. The assessment of the value of injuries is done according to the tariff laid down by the Sheriat law and is done not by the *gudi* of elders but by the Kadi the Moslem judge. His report becomes part of the general settlement.

Another convenient customary institution which is now absorbed into the British legal system of bail bond, is that of taking security (*dummin*) for the appearance of accused persons. This was part of the old apparatus of the tribal councils.

To this broad outline of the indigenous legal organization of society there are a number of minor incidents, which control the working of the exchange system, when there is inequality of status. A free camel-owning Somali loses status temporarily, if he has to rely on the protection of anyone but his own family, within his own clan grazing area. Internecine clan quarrels, regional droughts, and external marriages however, often lead to the movement of small family groups into the areas of some other clan. Here they dare not stay, unless they are under the protection of some member of the local group. The compulsive

phrase demanding protection is *magan ban ku ahai,* which may be compared with the ancient Arab phrase used for the same purpose in the high deserts of Arabia *ana dakhilak.*[10]

A man may become *magan*[11] to another as a result of poverty, or quarrels with his family. It is a voluntary act, which can cease at will. The protector of the *magan* has no special title as such, though the Arab traders used the word *aban.* This means really the owner of one or more individuals of the outcaste serf tribes, (Midgans, Tomals, and Yibbirs) who are known collectively as *Sab,* a caste name which distinguishes them from the Somali freemen *Aji.*[12] The Arab traders required an equivalent for the Arabian institution of *rafiq,* i.e., "companion and surety," for passing through the wild country of the interior, and they used the word *aban* as a translation, (which no doubt flattered the Somalis while doing no harm to the Arabs!). The *magan,* if he is a permanent resident, usually performs a variety of services for his protector, although, as a result of the stock he has received, he is often independent of him. It is considered avaricious, though in fact it is common practice, to ask for such a deposit to be returned if the *magan* leaves the area of his protector and reassumes his own liberty of movement. A permanent *magan* of this sort will pay a share of his protector's liabilities for the *mag* of his clan's killings. The temporary *magan* who demands only safety for the course of a journey, naturally is not involved in any of these stock arrangements, except that it is the duty of his protector to see that *mag* is actually paid by his clansmen, if they kill his *magan.* Sometimes such a protector may endeavour to claim this sum for himself, but he will usually find it impossible to maintain his claim against blood relatives of the deceased.

The same system applied to the payment of compensation by or to the *Sab* people. This was organized through the respective *abans* of either side, who levied payment on the relatives and paid a proportional share themselves. If there was no *aban* available, (for all *Sab* were theoretically subject to one or other *Aji*), the only action possible was by straightforward retaliation in which the injured party usually looted the offending *Sab.* The system of *aban* or protection is rapidly falling into abeyance as the *Sab* assert their independence and equality before the law. The Italians by recruiting *Sab* and *Aji* irrespective of status for their *Banda* troops also probably contributed a good deal to this change. Nevertheless, this change in status is much resented by the *Aji,* who are bitterly scornful of the *Sab* and only too ready to interpret any demand for menial labour from them as an attempt to lower them to the social level of the *Sab.*

In recent years, when the inequitable boundary arrangements were an encouragement to the elements of disorder to

cause the maximum nuisance, the habit of *falag* (from the Italian word *farago*) grew up, which was a distinguishing name of outlawry for a robber, who was even prepared to raid his own clansmen. Somali society had not yet developed a social mechanism for dealing with this menace, which they left to be kept in check by the European administration.

One feature of customary law has been omitted; the case for compensation as apology (*haal*) for wounded honour, as a result of any of the following acts: public insult by a slap in the face from one grown man to another, by a blow with a shoe, or a whip, rape, or illicit intercourse with an unaffianced virgin (*haal* to her father); marriage to a girl already affianced to another man, (*haal* to her fiancé); failure to marry the girl after the betrothal (*haal* to her father) uninvited entry to a man's house or uninvited conversation with a man's wife (*haal* to the husband). The normal rate of compensation for all these improprieties was a pony (value five camels), whose possession gave prestige to its owner. Later this sensible "functional" exchange degenerated into a mere cash payment.

The spread of Islam among these hamitic tribes ([13]) put an Islamic gloss upon the customary organization of the country, but never produced any effective change in the tribal customs relating to compensation. The lex talionis (Arabic *gisas*), which is the principle of the Sheriat law, was never introduced; for there was no supreme authority to enforce it, and so the looser and less brutal methods of pagan compensation continued. Only the Sheriat took over three spheres of law; marriage and divorce; the division of the inheritance of deceased persons together with the rules of mortmain; and thirdly, the assessment of wound compensation, usually described as a man's *haq*. On both of the latter topics a convenient list of rules and tariff of valuation for injuries already existed, which could easily be applied and thus save argument. It was to deal with these three sections of the law that the Kadi's Courts Ordinance No. 17/1937 was eventually passed, legally recognizing the power already exercised. It should be noted that *haq* means "justice," "truth," "right" both generally and in individual instances. It is the direct contrary of *dullum* and injustice, grievance, wrong.

As regards marriage, the Sheriat law produced singularly little effect; the three gifts, betrothal payment, bride price, and dowry continued, although the first two were forbidden by the Sheriat law. Only two innovations appeared, a recognised wedding present from husband to wife which became the wife's individual property, and the right of the woman to maintenance which was established.

Islam introduced a system of divorce which put the male sex at a considerable advantage; for only they could divorce.

They could, by the "single divorce" (*dalgat*) separate their wives from themselves without maintenance, and, by bringing a complaint of disobedience, gain from the Kadi an order of "judicial separation" known as *nakira* or Arabic *nashiza,* which usually ended in the wife becoming a prostitute to maintain herself. The female sex, however, developed their own equally effective indirect methods of maintaining their status and of the two they are to-day probably the dominant sex, since they are far more economically indispensable than the males. The Islamic divorce spell (*dalak*), however, acquired a position of peculiar indirect importance quite distinct from its direct function. It became used as a form of binding oath with economic sanctions: for, if a man was made to swear to the truth before his "in-laws," and confirm his oath by the triple divorce spell (*dar saddeh dallak*) his action was irrevocable. If afterwards the man was proved to have been lying, his marriage was destroyed by his own action and thus his bride-price was wasted. This oath was naturally more powerful than the oath on the Koran, which was only enforced by a vague religious sanction.

However, the Koranic spell was used by the Moslem *mullah* or *wadad* in two ways which had legal application. First, as an ordeal (*luqmata hajjar*—stone morsel) by making each of a row of suspects eat a morsel of bread, over which a conditional curse had been read, and thus revealing the guilty by his inability to swallow the bread which becomes like stone in his mouth. Secondly, as a conditional curse on an enemy or escaped thief whose naked foot-track is scraped up and taken to the *wadad* who reads the chapter of the Koran known as the *yassin* over the dust, which is believed to cause the spirit of the man to shrivel, so that he goes mad and dies. This curse is called *rad-qad*—"track-taking" and is still much used. It is noteworthy that this chapter (*sura*) of the Koran which is called the *yassin* is the one used to shrive the soul of a dying man as he gives up the ghost. Its use as a curse is, therefore, easily understood on normal lines of magic, as it is a blessing so to speak turned inside out.

Such was the situation when British influence began to extend into the interior at the beginning of the century. There is no need to dwell on the long intervening lapse before the exhausting, guerrilla war with Mohamed Abdulla Hassan was brought to a close with his death on 23rd November, 1920. The administration was then faced with a situation analogous to that of the Sudan Government after the battle of Omdurman. It was thought necessary to try and impose a limitation to the constant feud murders which racked the country, but the administration had been deeply impressed with the violent and fractious nature of the population, whose chiefs (*sultan, gerad* or *ugas*) had little control over them. No attempt was, there-

fore, made to build up society on a tribal basis; but certain elders of wealth and importance, who represented particular *jilibs,* were given Government recognition in each district as *akils*—"wisemen." They were employed first as arbitrators and finally by the Akils' Courts Ordinance of 25/5/21 established as members of district native courts with a minimum quorum of three and a full court of five members. The jurisdiction of such courts was limited by Proclamation of 12/3/1928 to a subject matter not exceeding Rs. 60-0-0 or four camels or 36 sheep. This jurisdiction was extended by Notice of 30/9/31 to ten camels and 50 sheep, but its nature as a purely civil court was not changed. The *akils* were limited entirely to civil powers though the subject matter which they dealt with often concerned matters of a nature regarded as criminal under British law. They were allowed "on receipt of written authority from a district court—

To enquire into and decide

(*a*) any point of native law and custom.
(*b*) any question relating to the value of *yarad* or *dibaad* paid or to be paid.*
(*c*) any matter affecting the value or amount of stock or property transferred, or paid over, or alleged to have been transferred, or paid over, on account of a tribal or other settlement.

Provided that nothing in this section shall be read to mean or to include any question of Mohammedan law or any question affecting the administration of Mohammedan law."

In other words the Akils Court was regarded with grave suspicion. It was not given the old powers of a tribal *shir*, but was restrained to settlements as a court of first instance to matters relating to minor wounds, insult and petty stock theft, and to acting as an advisory council to the District Court.

The place of the tribal council was taken by the District Court, whose directions were contained in the Principal Order-in-Council, 1929, Article 12.

"In all cases, civil and criminal, to which natives are parties, every court

(*a*) shall be guided by native law, so far as it is applicable and is not repugnant to justice and morality, or inconsistent with any Order-in-Council or Ordinance, and
(*b*) shall decide all such cases according to substantial justice, without excessive regard to technicalities of procedure or undue delay."

**See* Glossary—Section "Marriage."

The wording of this Ordinance made possible a great mass of cases outside the range of British law, and which were hardly subjected to any form of legal scrutiny. In some district offices a record book of decisions, which defined various aspects of tribal custom, was kept, and thus some degree of uniformity within the district maintained on grounds of precedent. The District Commissioner for all practical purposes became a tribal *sultan* wielding arbitrary powers according to what he thought was a reasonable compromise between local ideas of customary right and his own European ideas of moral justice. His judgments in this sphere were given legal sanction and support by the Political Cases (Attachment of Livestock) Ordinance No. 3/1937. The situation differed considerably from that in districts in East Africa where under one or other of the various Native Authority Ordinances, the District Native Court has certain criminal powers, and is usually itself a court of appeal from various inferior courts, while a right of appeal exists from it to the District Commissioner and thence to the Provincial Commissioner, or to the High Court.([14]).

In British Somaliland, the disadvantage of the system was that the entire machinery of administration became personal in nature, far too much direct work was thrown on the District Commissioner, who was thus forced to act as a court of first instance for all serious crime within his district. Moreover, as the machinery of the police force also largely depended on him, all investigation was under his direction. Either he was hopelessly overworked, or else far too few cases were taken up to impress the civil population with the existence of general legal sanctions. In an undisciplined and irritable society like the Somalis, the situation was very difficult. Owing to the unfortunate methods of colonial financing, it was impossible to get additional staff without upsetting the Colonial Office Budget balance. However, a grant-in-aid was eventually obtained from the War Office for the maintenance of an armed force, the Somaliland Camel Corps, as a part of Imperial defence, although there was no serious intention of ever using it outside the country.

Thus while there was established a military unit capable of undertaking large-scale operations, there was still no force under the direct control of the District Commissioners sufficiently mobile to maintain necessary contact with the tribesmen and strong enough to carry out day-to-day police work. For this reason small incidents which in the early stages could have been dealt with by a few police had to be allowed to grow until the gravity of the situation justified military action. This did not make for good administration.

It may be noted that for the time being the situation has been met as regards policing in British Somaliland by the

employment not only of an official police force but of a permanent district establishment of *illalos* (scouts) who are directly responsible to the District Commissioner, and in Somalia by the posting of a platoon of Gendarmerie to each District Headquarters, working under the direction of the Political Officer. These arrangements, however, have not brought the need for the Camel Corps to an end. Apart from the general security of war-time defence, the Ethiopian frontier will require armed protection for as far ahead as can at present be envisaged.

To return to the legal position in British Somaliland and the working of District Courts. At the same time as the "political" case was given grounds of legal recognition by the Principal Order-in-Council of 17/12/29, the Indian Penal Code and Indian Ordinances generally were brought into application by Article 16 "so far as circumstances permit." Thus the compromise position was reached that the District Officer investigated all reported cases of "killing." If after investigation, the crime appeared to be of a brutal nature it was, if possible, taken up criminally to be tried by the Protectorate Court.

Two difficulties lay in the way of the effective use of this coherent body of law as an instrument of social education. The first was that the Indian Penal Code, like the English law envisages an effective police machine. In fact, many of the rules exist to safeguard the accused from a perhaps not incorrupt and certainly powerful police force. In a country where the police force was still largely controlled by lines of clan loyalty rather than by an *esprit de corps*, it was difficult to work, the more so as the very great majority of constables and N.C.O.s were illiterate and had no ideas or instruction in police detection or prosecution. Secondly, there was the extreme difficulty arising from the fact that this desolate stretch of sand, scrub, and rock which forms Somaliland had become a pawn in European politics. The imposition of European "national" boundaries which cut across tribal grazing areas was at first regarded as a meaningless insult. Later, with the attempt to impose on either side the administration of European law, it was found a convenient sanctuary from justice for malefactors. "Over the border" acquired the same meaning as in our mediaeval and early modern history of Northern England.

District Commissioners were, therefore, reluctant to apply the sanctions of criminal law since the chance of their successful application was so extremely small. Blood called for blood, or compensation. If a case was taken up criminally, compensation ceased to be applicable; but the chances of the murder being revenged by the injured clan, if hanging was not effectively carried out on the criminal, were very high. It was, therefore, preferable for the District Commissioner, who was concerned principally to reduce the unrest in his district to a

minimum, to take as few cases as possible by normal methods of criminal prosecution, since with the means at his disposal he had little chance of bringing a prosecution to a successful conclusion.

The difficulties in his way were not merely those of escape from arrest. Collective punishment provided machinery for that; (if it was sufficiently clear that a man's group had aided his escape). The trouble lay deeper, for the feud organization and the control of the Moslem religious leaders (*wadads*) over a superstitious peasantry rendered the procedure of English law practically useless. The sanction of the oath on the Koran had been destroyed in the courts, or at least gravely weakened by these religious leaders who taught that—

(1) there was no religious penalty for a false oath, even on the Koran, if made before an infidel.
(2) a false oath made to save a man's life carried no penalty.

A third point of no little importance in decreasing the prestige of the Koranic oath has been the difference between British and Islamic legal procedure. In a Moslem Court all evidence is given unsworn until the judge is convinced of the correctness of the case of one or other party. Once he has made up his mind he presents the successful party with the Koran and asks him to swear to the truth of his statement. This closes the case and everyone is impressed with the strength and divine character of the oath. In British law, all parties are sworn, even in quite trivial cases and the fiction is maintained that all evidence given on oath is true. As such evidence constantly and repeatedly conflicts, and no divine intervention blasts the liars, the religious sanction of the oath has consequently deteriorated.

For these reasons a prosecution by the State for a murder committed by one clan against another, was (and is) regarded merely as a clan fight reduced to legal terms of organized perjury. A man could and still can, call for evidence from his clansmen who will freely and automatically perjure themselves in his behalf. The answer to the great majority of criminal prosecutions of all kinds is a manufactured alibi supported by as many witnesses as the accused or his *Akil* are prepared to fee to leave their normal occupations on the pastures and come in to court. No appeal, however ridiculous, is to be neglected, and grave injustice is often done, as criminals escape to vaunt their prowess after wasting large sums of public money on their maintenance and that of their witnesses, and even on the provision of additional skilled legal defence to aid them to escape the punishment they deserve. Public contempt of the law, therefore increased, as did proportionately the ramifications of clan revenge.

Moreover, since the powers of the tribal chiefs (*sultans*) had been absorbed by the District Commissioner, (who was necessarily but an infrequent visitor in the clan grazing area) the countryside lacked executive leaders; for, without power to maintain it, the name of *Sultan* was but a mockery. The Court *Akils*, into whose hands Government had bestowed a modicum of power, held this only when in association with the District Officer during their three months' period of service at headquarters during the year. In general, they lacked sufficient personal prestige and were too badly paid to resist the temptation of their short term of power. Their courts became a byword of corruption and bribery, so that litigants always tried to avoid them by going direct to a district officer. Since their work was done at the district headquarters they acquired permanent houses there and so often became divorced from the clan groups they were supposed to represent. Instead, they form a reactionary townee group of ignorant, factious, professional litigants, whose vested interests, combined with that of the *wadads*, form the greatest obstacle to progress of all kinds, while their extravagant fees are the chief impediment to any equitable settlement of minor cases. The average plaintiff prefers to accept minor compensation, or inflict direct retaliation rather than fall into the jaws of these insatiable sharks. Sidney Smith remarked, "Where judges are unjust, the nation falls: for then the multitude has nothing to defend." Such is the present condition.

The country is faced by a number of vital problems in which economic and political factors are deeply intermingled. First, it might be said, is the need to establish a controlled grazing system by which the progressive desiccation will be checked. But it is impossible to enforce such a policy without more effective political control than is at present maintained over the small nomadic groups. The closing of areas to prevent them being grazed for a period (and thus allow their recovery) demands constant patrolling and a larger force of police and veterinary scouts than could be supported on the pre-war budget. The desiccation of the Ogo well area and of the Nogal Valley is, however, of wider significance than to British Somaliland alone. It is a compulsive force which must in the long run either drive the Somalis southward, setting up a series of migrational waves which will flow over Galla-Sidamo or into Kenya, or else compel them to leave their country altogether by sea to work as sailors, soldiers, cattle-traders or dragomen in East Africa or the Mid-East. It can thus be seen that the problem of social stabilization of the nomad in Somaliland is one of very great exterior political importance.

It may be noted that the same problem has arisen in Arabia and that H.M. King Ibn Saud has made use of the *Ikwan*

organization of the Wahabi sect as a form of irregular religious and political police to tie down various Arab clans to the particular wells to which they lay claim, and to organize there some degree of irrigation agriculture in the surrounding oasis.

For this purpose some degree of compulsion and direction is necessary. Doughty has described the extraordinary difficulty in getting the Semites to combine on any voluntary enterprise of common benefit (for example, the repair of the great well at Kheybar). The Wahabi zealots under the direction of their enlightened king seem to be providing the necessary stimulus. It is probable that a similar attempt was made in Somaliland at the time of the Mohammedan invasion of Ethiopia early in the seventeenth century A.D. It has been suggested that [15] the ruined villages (of which traces are found in many places from the Harar-Borama region right across Somaliland to the Nogal) are but trading towns, which existed to handle the loot from the sack of Ethiopia, and naturally faded when their economic basis disappeared. This may well be so; but I would put forward as a suggestion, from the position of these ruins on cultivable land and the fact that on most sites the mosque is the most prominent ruin, that many of these "villages" must have been institutional settlements by one or other of the great *tariqas*,[16] where religious instruction was given and organized agricultural work carried out (probably by slaves and women) at the same time.

This method is hardly available to the British Government on a broad scale, though in modified form it is still continued in the case of one or two *sheikhs*, who combine religious sanctity with personal prestige (e.g., the happy and prosperous settlement of Sheikh Ahmed Sheikh Musa at Hahe). It would be impossible for an "infidel" Government to organize with compulsion a series of Islamic religious-cum-agricultural settlements, though these might well be encouraged if there were suitable religious leaders capable of their management. This might be done by negotiation through the leaders of the great *tariqas* in Mecca, if the scheme met with the approval of the Saudi King (which it might well, as it falls into line with his own internal policy). Nevertheless, it must be remembered that most Somalis are bigoted *sunnis,* and regard with grave alarm the reforming iconoclasm of the Wahabis in the sacred cities. The choice of personnel would thus be a somewhat delicate matter of internal Islamic church politics; but if successful, it would be well worth the effort.

Whether or not a religious framework is employed for developing irrigation agriculture, there is little doubt that this is the only hopeful method of making these vast barren areas profitable and able to carry more people at a high level of civilization. At present the violent spates which fill the Tug

Der (the watercourse that drains all central British Somaliland into the Nogal Valley) flood the steppes below Ber and then evaporate wastefully. A proportion of the water presumably reaches underground streams to fill the Nogal wells. A dam above Burao coupled with proper forestry control would give a controlled supply which would soon make British Somaliland self-supporting in sorghum and maize. Such a scheme would require the introduction of a number of peasants skilled in irrigation agriculture, for the nomad is not so easily to be wooed to a life of toil. The same applies to similar schemes for operation on the upper reaches of the Fafan Shebelli Juba and Tana rivers. It is this need for an agricultural population that has turned some peoples' eyes towards India with the idea of settling in these areas the overflow of Moslem peasants from the Punjab. Such a scheme is full of possibilities but also fraught with great dangers.

The control of the nomads must begin with the proper demarcation of their clan grazing areas and watering rights. On this fundamental basis it is possible to allocate strategically a number of centres where matters of judicial and tribal importance can be discussed at regular intervals.([17]). Thus it may be possible to keep the nomads away from the evil influence of such towns as Burao and under the direct control of their own natural leaders. Once this is established, which may take five to ten years, it may be possible to institute what is a fundamental factor in any properly organized Government, that is to say direct taxation. The present method of taxation by excise, market dues and transit dues, certainly collects some revenue, but leaves the ordinary man entirely out of relation with his Government. Proportional clan tribute (*Zakat*) on a stock assessment, is a fair and recognized method of raising revenue, which is found in all Islamic countries—throughout Arabia and in the Anglo-Egyptian Sudan, where the stock assessment is done by the clan and roughly checked by the District Commissioner. The trouble in Somaliland is that this direct tribute (called *Ziko*) is drained improperly into the pockets of the leaders of the *tariqas*. It is said that a proportion of this money is forwarded to Mecca to maintain the *tariqa* buildings there, but no accounts are kept. (The payment is similar in type to the payments of Annates, Peter's pence, etc., which were collected from all over mediaeval Europe to maintain the Papal Court in Rome.) Certainly, in Mecca, as in Rome, pilgrims benefit from the existence of these great institutional hostels; but the cost is out of proportion to the gain in services to the inhabitants of a very poor country. Moreover, it is a fundamental question of principle, for who collects the *Ziko* or *Zakat* is the ruler of the country and it is clear that the religious leaders still hold this position in their own estimation. As a

result they are exceedingly nervous of any threat to their interests and it is probable that any attempt to collect direct taxation in the form of a proportional stock levy would be met by armed resistance organized by the *wadads*. It would be dangerous and useless from the financial point of view, to attempt any such policy until the tribal leaders have learnt once more to organize their people into coherent groups from whom they can exact some degree of obedience.

It is arguable that the tendency developed under the present Political Cases (Attachment of Livestock) Ordinance, 1937, is not the best method of achieving this, since it necessarily concentrates all authority in the hands of the District Commissioner. Devolution of authority would appear to be the wisest policy as has been proved in East Africa and the Anglo-Egyptian Sudan. It is suggested that in Somaliland as elsewhere the same man should gradually be trained to combine the offices of tax collector and judge; to occupy the position of "chief" in a given area, even if he is assisted in his work by clerks for the first, and elders for the second set of duties. This involves the disappearance gradually of a large number of inefficient, badly-paid *akils*, and their replacement by a much smaller number of well-paid *sultans* with a trained staff.

The control of finance is ultimately the deciding factor in any society. Where there is a stream of trade it is usually possible for the local small chief to set up sufficient resistance to make a portion of it flow into his own pockets. Immediately his wealth and consequent power increases out of all proportion to that of his followers. He can buy new and better weapons and additional horses for raiding, and employ personal attendants, or slaves. Where no such stream of trade exists, the tribal chief tends to be but first among equals, an elder to whom respect is due on account of his birth and personality, but who cannot exact obedience by force, or purchase homage by lavish hospitality. Thus the Sultan or *Gerad* of the Warsengeli is perhaps the most powerful Somali tribal chief within his tribe; for his influence is strong in the *dhow* traffic from Las Khoreh and Elayu to Aden, and in the organization of the frankincense trade. Similarly, the Sultan of Obbia in Mudugh grew powerful on the profits from the monsoon *dhow* traffic from Makalla and the Persian Gulf and the consequent trade into the interior. The chiefs of the nomad tribes of the hinterland rarely acquired much position of control; for example, the Habr Toljaala have no Sultan, the Ogaden are split up among many small rival chiefs, and the position of the Habr Yunis Chieftainship, which was once of some importance because of the trade of Burao, faded away during the wars with the Mullah, followed by the British control of the entrepot trade there.([18]) The *Gerad* of the Dulbahanta, based on Las Anod, was able to extract some

small profit from the occasional caravans in the Nogal Valley coming up from Eil, and so maintained himself in a slightly superior position to his followers. The same applies to the Sultan of the Habr Awal whose people grazed around the caravan routes from Zeila, Bulhar, and Berbera to the interior.

The Sultan or *Ugas* of Gadabursi was at first in a distinct and advantageous position, for not only did the caravan route to Harar run through part of his area, but his people are partly cultivators and so far easier to control and tax. Yet for this very reason, after the 1897 Anglo-Egyptian Treaty, the *Ugas,* a far-sighted man named Nur Robleh, did everything in his power to prevent his people cultivating, for he realised that it would bring them under the control of the Amharic authority established at Harar ever since retirement of the Egyptian Garrison from there in 1884. However, circumstances were too strong for him to resist, and during his lifetime he agreed to pay a nominal tribute of bulls every year for his tribe's right to graze on its own territory now under Ethiopian control. His son, Robleh Nur, went further and accepted an Ethiopian stipend and collected taxes for Ethiopia from his tribesmen with the help of an armed guard. This led to such trouble that he was by general acclamation ejected from the chieftainship. From this started a feud which split the Gadabursi tribe in two parties and this unhappiness has persisted up to the present day.

It can thus be seen that the problems of Somaliland consist of a whole series of interlocking factors which cannot be treated separately. The unrest which causes embarrassment to any central government authority apart from being a normal feature of nomadic life, derives directly from two distinct sets of causes, one biological and economic, the other political and administrative.

The grazing problem cannot be finally settled by improved grazing methods alone. Even if reserves, watering areas, rotation of grazing are all organized on the most enlightened and intelligent plan, the natural increase of stock will eventually advance beyond the capacity of the land to carry it, the tribesmen will tend to expand their grazing areas and so a political problem will arise. Formerly tribal wars and periodic droughts caused sufficient deaths to limit this expansion, so that there was a balance maintained between the vegetational cover of the soil and the animal life depending on it. Artificial peace imposed from above destroys this balance, and the only means to regain it can be by some artificial removal or destruction of the surplus stock. The most natural and profitable method of doing this is by stock markets, worked if possible in conjunction with some scheme for the export of meat, either canned, frozen or on the hoof. The standardized grading of hides and the utilization of by-products for manure are natural corollaries.

Stock markets by themselves are ineffective; for, unless there is pressure to sell, the herdsmen, who are practically self-supporting, will only sell a small proportion of their surplus, quite insufficient to relieve the pressure on the land. The natural means to create this pressure to sell is by a stock tax an institution which is found in many parts of Africa where Moslem nomads are in the majority. It is usual to leave the collection to the native authority, while the European officer supervises, hears complaints and requests for exemption. Lord Hailey in his *African Survey* (pp. 577-9, 589) describes the Jangali Tax in Northern Nigeria which is levied at a rate of Sh. 1/- or Shs. 1/6 per head of stock by the tribal headmen on the wandering Fulani cattlemen. This tax is assessed and collected when the cattle-owners return with their herds to the districts in which they are deemed to be resident. The same type of tax, known as "pacage," is levied in Senegal, Mauretaina, the Niger, and French Sudan. Such taxes are much more easily organized where there is an effective tribal authority. It would be difficult at first in Somaliland with the minute social unit of the *jilib*. It is obvious that some deliberate administrative change is required which will develop increased wealth in the country and canalize revenue so that a comparatively small number of individuals in each area can be made responsible for tax collection. The institution of tribal chieftainship is the natural one to revive for this purpose.

Such a policy is perhaps more dangerous here than elsewhere; for there is no doubt that the Somali's leading characteristics—bred of his bitter struggle for existence—are jealousy and avarice. Thus there is always the danger of a man's neighbours combining to destroy him since he has received the recognition of government, and, contrariwise, of that man using his position to further the interests of his clan, or to divert revenue to his own ends. But these risks must always be taken in the early stages of developing a native administration, and there is no reason to suppose that the nature of the Somali is such, that he will not eventually respond to the same processes which have been applied successfully on Semites to the North of him and on Bantu to the South.

Thus it will be seen that the fundamental need is to re-educate Somali public opinion so that the sanctions of behaviour are not merely those that govern a minute self-sufficient group of nomads; but of a wide community. This process of re-education must begin from the top, to produce a very small intelligentsia of chiefs, clerks, dressers, and veterinary assistants who can manage efficiently the apparatus of Government, without confusion or corruption, and who are in spirit "Government men."

Their education is best done outside the country beyond the pernicious influence of the *wadads*. That is why the government sends all the boys it can afford to Gordon College at Khartoum. Once these new men are sufficiently numerous to control the machinery of local politics, the reforms which are so urgently needed can be carried through effectively.

I append for consideration a letter of comment written by my uncle C. A. Willis, C.B.E., late of the Sudan Civil Service, describing the gradual introduction of a policy of taxation on the lines suggested here in the early days of the Sudan Administration after the fall of Khalifate and before World War No. 1.

NOTES AS TO METHODS EMPLOYED IN EARLY ADMINISTRATION IN KORDOFAN.

By C. Armine Willis
(late Lieut.-Governor, White Nile Province, Anglo-Egyptian Sudan.)

I was much interested in your comparison of Somaliland with Kordofan. I daresay the conditions when I first went to Kordofan were fairly parallel as famine was either prevalent or so near that one hardly noticed the difference and general poverty was appalling. But the province recovered rapidly owing to the Gum trade, which introduced money from outside, whilst Government and other demands for camels, horses and cattle went a long way to enable the nomad tribes to meet their liabilities.

Taxation was a difficult problem and the Sudan Government met it largely by trial and error. There were two main methods—tribute which was assessed tribally, and grain and herd taxes which were supposed to represent the Moslem tax of 10% and were assessed by local boards and imposed individually on the produce. There was also a tax on irrigated land, which I think we may neglect in the immediate circumstances but it was run on the same lines of a 10% charge on produceable value.

Tribute under the Turkish Government was assessed tribally, e.g., the Kabbabish were assessed at £E.1,000, but the Government to avoid trouble farmed out the collection of this sum to professionals who sent out armed bodies to collect what they could, and the tax farmers would probably get £3,000 and the armed parties would collect their bit on the side and what the tribe actually paid was probably over £5,000 and possibly nearer £10,000, as the tribal sheikhs and headmen still expected to get their bit.

To avoid this, it was arranged that the head of the tribe should pay in his money himself to the Governor of the Province under Sudan Government Rules. Actually the Kabbabish were an interesting example, because Ali Wad el Tom when he was Nazir made no secret of the fact that what he collected off the people was considerably more than the £1,000 assessed—he admitted to J. D. Craig, who was District Commissioner, up there, that he was not doing all this for his health, and he collected I imagine about £2,000 over the tribute (which he took mostly in kind, camels which he put into his own herd), to enable himself to run his own show, entertain the tribesmen and keep up his position. This system inevitably led to grave abuses—a Nazir could apportion the tribute more or less as he pleased and he naturally put it on heavy to his enemies and lightly to his friends. So much so, that steps had to be taken amongst the Hamar and the Baggara (here I

speak from my own experience) to allot the exact proportion of the tribute due from each section of the tribe. This gradually developed to such a pitch that the tribute was practically assessed by families, and after a short time we were able to introduce the normal herd and grain tax.

When I first went to Kordofan I was put on to supervising the assessment of herd tax and it did not take me long to discover that the "board" was completely corrupt. Two lists wers made, one more or less truthful which was used by the Sheikhs to collect what they thought they could get, and another to put in to Government which was put at such a figure as the Government would accept without too much misgiving. Of course, as people became more literate and more capable of approaching Government on their own they began to demand receipts for what they paid and expect them to be accurate, and though the system can never be really accurate, it works well enough when there is sufficient publicity and knowledge of what are Government dues and what are not.

It is not to be expected that Sheikhs and Nazirs will work without recompense and what the Government gave them as commission for tax collecting was quite inadequate. There were, too, various customary payments to the Sheikhs, which had no official stamp, but it was conveniently desirable that the Sheikh should get, as an honorarium for his trouble and as a hold over his people. An example of this was *Fitr*, which is technically a payment to the local Moslem religious leader as a sort of charity like Easter Sunday collection—I remember Slatin being absolutely outraged when he found the Hamar and Baggara Sheikhs collecting it for themselves. But he had to give way because it had become a tradition and they were going to get something out of their people. There is not much altruism or public spirit about an Arab—and in a state of poverty it is not to be expected. The boards, who assessed the herds and crops, were appointed so that in theory no village assessed itself but only its neighbours—and a clerk was supplied or paid by Government to record the findings. In theory, they went to each holding and saw the herd and/or the crop and assessed accordingly, but you can imagine that that entailed a lot of bother and early rising so a statement "on oath" took its place, which was practically valueless.

To go back to the introduction of tribute—what the Government did was to assess, say, the Kabbabish at £1,000—the Governor of Kordofan (or District Commissioner) then saw the Nazir and said you will have to produce 200 camels assessed at £10 each. The Nazir naturally sent in all the worst he could and even if they actually numbered 200, they probably could not be realized at the assessed value. The Government took over what it could use at a valuation and sent the rest to the local market and credited the result as tribute paid by the Kabbabish. If there was a discrepancy, it was adjusted through the Finance Department, e.g., animals taken over by Government could be valued at any figure the Government liked so that the resultant figure might be anything. It was all right in British hands but open to a lot of juggling, and as often as not the people who brought in the tribute animals would swop half of them for worse beasts *en route* and pocket the difference. Slatin's attitude at that time was that it did not much matter so long as the appropriate gesture was made. The tribe could hardly be blamed if the market in camels or cattle was bad and prices did not realize what had been expected when the assessment was made. The fact was that the necessity of collecting Government tribute and enforcing that on his people did give the head of the tribe some authority and did introduce a bit of discipline where there had been very little.

People commonly attribute powers to a native chief that he could never have and would not know how to use. Ali Wad el Tom who was

very famous as a "strong" Nazir of the Kabbabish, as a matter of fact had to consult at least five "Jekies" (local religious lights) before he could put anything over the tribe.

Even if there are not tribal chiefs, there are always individuals who take the lead in the various tribal activities, e.g., somebody considers it time to go to such and such a grazing ground and everybody accepts it more or less, because they cannot afford to get away from the mutual protection provided by the community. How far such men can be roped in to help Government to make some sort of discipline in the tribe or section depends enormously on your administrative staff, their power of selection, persuasion and sometimes compulsion.

I see I have not answered all your questions.

Assessment in the case of nomad tribes was more or less blind—until some data could be obtained. There was no compulsory system of branding because all tribes used their own brands without compulsion and had to for security's sake. The recovery of an unbranded camel that had been stolen was pretty hopeless. Assistance was mainly passive, i.e., they just didn't pay and the Nazir, or who ever it might be, simply said "so and so" will not pay, and small punitive forces used to go and collect by force as many animals as were required. This led to the grossest injustice, since, as often as not, the people whose herds were raided had already paid their share; and one of the jobs I had to do was to sort out the Baggara tribute and find out who had paid what, and it was a ghastly job. Later on when I had been through the tribes and knew the country I was able to disconcert them by arriving at their watering places unexpectedly and wanting to know things, but it was a very tiresome job and very hard work. But roughly there was at least one local expedition every year against some recalcitrants up to 1909. After that MacMichael amongst Kabbabish and I with Hamar and the Baggara managed without military assistance. But it could only have been done by chasing the tails of the recalcitrants before. It could have been done better and more equitably if the soldiers had known more about the administrative problem, but you can't get everything.

In the first year or so the Governor or his deputy went through the troublesome tribes with a biggish escort and collected tribute as he went along. Then if there were runaways, and it was practicable, they were pursued and their animals taken plus a fine. In practice this did not often occur, because the native ran too fast and too far. But the idea of a Government, and the necessity of paying it to go away, took very little time to absorb.

The answer to the question which is thus implicitly presented—"Why if this was done in the Sudan, has the same policy not been applied in Somaliland?"—is a simple one—"It is the frontier." But a discussion of the frontier takes one into a little known corner of diplomatic history. The territory of the Anglo-Egyptian Sudan owes its present happy and peaceful condition to the condominium established there following Kitchener's campaign in the Sudan which brought to an end the Khalifate at the battle of Omdurman. The same series of events were ultimately responsible for the unfortunate conditions obtaining for several decades in the Somali areas. Lord Salisbury was deeply concerned with the importance of the Sudan campaign and the French advance towards the Nile Valley which led shortly afterwards to the "Fashoda incident." The Emperor Menelik at that time was successfully pursuing a vigorous

"forward" policy. The British required his assistance for the holding of the frontier in the Kassala area. Also it was hoped to prevent him co-operating with the French and allowing them to spread their sphere of influence from Djibouti westwards across Africa. The British Government were, therefore, not prepared to take a strong line with the Emperor as regards claims made for extension of Ethiopian influence in the Somali area. Looked at from a common sense point of view it is difficult not to sympathize with Lord Salisbury's attitude. The relevant importance of the Nile Valley, as compared with Horn of Africa was and is incontestable. Nevertheless, it is clear that the interests of the people on the spot were sacrificed for the benefit of other interests with which they were not even remotely concerned.

On the evacuation of Harar in 1884, by the Egyptian Government, the town was occupied by Ras Makonnen, Menelik's lieutenant and father of the present Emperor. It was Ras Makonnen who, in 1899, carried out the negotiations for the Emperor Menelik with Mr. Rennell Rodd, the British representative. Thus, although treaties of protection had been signed as far back as 1884, with the Esa and Gadabursi tribes, and subsequently with other British protected tribes, and even with the Ogaden in 1896; the whole of the Ogaden, very large parts of the Haud grazing areas (belonging to such tribes as the Habr Yunis, Aidegalleh, Habr Toljaala), the better half of the Gadabursi area and the greater half of the Esa country were signed away. This treaty represented a compromise to Ras Makonnen's claim for Ethiopian suzerainty extending right down to the sea-coast. It caused no disturbance at the time among any of the Somali people in the areas referred to, as they were entirely ignorant of the treaty, or its implications. It was only later as the clauses and boundaries began to be implemented that trouble started.

To-day as the result of General Cunningham's successful campaign in 1941, British administration extends from Eritrea to the Kenya borders. Except for the north-western marches of the Somalilands, where religious antagonism between Moslem and Copt provides a chronic danger to the peace, the question of tribal feuds becomes increasingly a matter of routine police control. Disarmament proceeds steadily and trade, once more on camel-back, is beginning to flow again along the old routes. Nevertheless, it must be remembered that present arrangements are but a temporary war-time solution. There is no certainty of a greater Somaliland until its establishment is ratified by the peace treaties. Although the Somalis are a potentially formidable community, they have few if any representatives capable of maintaining their interests in European circles, and for this reason they are likely to be overlooked in the council chamber.

But on the ground where they live, they cannot be, and any settlement which ignores their future as a single linguistic and racial group is certain to lack permanence.

Twice over in modern history the Somalilands have produced leaders capable of uniting the nomad groups by the stimulus of religion into an army that could wage war with considerable measure of success against contemporary Europeans. The first occasion was in the third decade of the sixteenth century when Ahmed bin Ibrahim al Ghazi, commonly known as "Mohammed Gran" (the left handed) led the Somalis of the kingdom of Zeyla (i.e., British Somaliland, including the Harar area) against the Ethiopians and Portuguese and defeated both until he was killed unexpectedly having relaxed his vigilance. The second occasion was during the present century when for two decades Mohammed bin Abdullah Hassan, the "Mad Mullah" maintained a guerrilla war against the British Government in spite of very great inferiority of arms and supplies. It is foolish for governments to pretend that the Somali likes one much better than another. British, Italians, French, and Ethiopians are all infidels with little but their money to recommend them. Indeed in spite of their long tradition of warfare and hatred for Ethiopia, the Somali might even vote, if given the opportunity, for Ethiopian rule throughout the Horn of Africa, as suggested by the irrepressible Miss Pankhurst. If he did so, he would vote for it, for the simple and beautiful reason that it would be no government at all, since no Ethiopian would dare to administer him. Life, therefore, would be the condition which the nomad prefers best—until he is the aggrieved party—simple anarchy and good grazing.

Such a policy of deliberate rejection of responsibility is not inconceivable. It has already been tried by the British Government in Somaliland, as indeed at various times in many other parts of the world. In 1909, Lord Crewe's despatch directed the cessation of administration in the interior and the retirement of Government to the coastal towns, which were of importance solely on grounds of naval strategy. The resultant period of anarchy, or "special acclimatization" as it might be called, of the population to the land and primeval conditions in which they lived, is still remembered with horror by the old men as the days of "Haram Oneh," when even a good Moslem ate filth, and nearly a third of the population died of internecine warfare and starvation. Richard Corfield's gallant fight at Dul Madoba in 1913, aroused political opinion in England to the position, and within two years the policy had changed to one which led eventually to the destruction of the Mullah's power and the partial pacification of the inland tribes. The chance of permanent stabilization presents itself at the end of this war in a form which is not likely to reoccur for a generation at least.

But if the ecological and racial questions that obtrude themselves so fiercely in this vast area of North-East Africa are ever to be settled, it will require not only a broad imagination to envisage them, but determination and tact to obtain concessions from all parties to get the needs of the local population recognized, where they conflict with larger vested, interests. Finally, it will require a stable unified administration of resolute character maintained over a period of years with the expenditure of a good deal of external capital on education, land improvement, and the development of a few local produce factories for export of the existing dairy and sheep products. Once this is done the Somalilands may become a useful asset in a world economy rather than a chronic liability to all who are concerned with them.

The intention of this paper has been to stimulate thought in a general way on a difficult and little-known series of problems. It is not its function to bring forward detailed suggestions as to the future, which must carry external, political implications and, for this reason, in present circumstances be ill-timed. The reader is asked to ponder his map, where the rivers, the mountains, and the vast plains will give him the clearest indication of how the country should be run.

NOTES.

(1) The more primitive condition is still the rule among the poorer tribes in Somaliland such as the Mijertein. The cash exchange is typical of the wealthier such as the various Isahak groups.

(2) The women not only play their part in herding the stock and watering but manufacture the plaited mats of which the nomad tents are made, and also make most of the utensils in ordinary use for watering and milking, which are water-tight baskets. They also erect and pack the tents when the family moves. The men's chief work is the summer grazing of camels far out on the Haud and the exhausting winter water-drawing from the wells in the Ogo. The various types of mat are *kibit*—flufly, dark-brown, of chewed bark, used in caravan for packing under the load next the camel's back: sometimes spoken of generally as herio-padding; *alol*—the stiff mat with withies interwoven, for the tent sides; *dermo-dior derin-ti* mats of palmtree fibre; *aus* lit. "straw"—the ordinary all-purpose mat with grass ends on one side and a plaited pattern on the other. Varieties of better quality mat with decorative patterns in which coloured rags, silk and wool are used are *hohog*—first quality, *iskujoog*—second quality, and *gogos*—third quality. On the completion of any big mat a woman calls all her friends to a sort of "sewing bee" called *aus la tidayo*—"the plaiting of the straw" at which they sing while the men sit round and listen and a good deal of covert flirting is done.

(3) Another alternative derivation given by Drake-Brockman in his book *British Somaliland* is from *So!*—"go!" *Mal!*—"milk"—the habitual courteous order of nomad host to his son or servant, when a visitor arrives. This is a picturesque suggestion but I believe unlikely. Most nicknames are abusive, and the Ethiopic "Soumahe"—"Heathens" given after the campaigns of Mohamed Gran is, I believe, the most probable origin of the name "Somali." This explanation will not be found popular among the Somalis themselves where the first or second derivation is preferred.

(4) The normal word of importance in greeting a stranger is *qolo*. Thus the almost invariable question is "*Qolo matahai?*"—What is your clan?" The *tol* is of too wide extension to be of daily interest. It is often used on the same level of social extension as *assal*—confederacy. Thus, e.g., the Ogaden may be considered at the time as a single stem (*tol*) and also as a group or confederacy (*assal*) of independent clans. Some people prefer to spell *qolo* — "gholo." Paulitschke in his *Die Ethnographie des Nord Ost Afrikas* spelt it "*Kola*."

(5) The ramifications of in-law relationships are most important. A man tends to get his wife from among the females of his mother's family, and this custom naturally reinforces the original marriage bond between the clans. When considering a marriage a man naturally takes into account the benefits he is likely to gain in grazing and watering rights from his "in-laws." In any consideration of clan grazing areas this system of insurance, by which a man can eke out existence in times of drought and trouble with the help of his in-laws, must be taken into account.

(6) In British Somaliland, the word *wa'ad* is used, further south *musalaha* tends to be commoner; both are Arabic in origin.

(7) There is a distinction between the modern *panch* and the old *gudi* (which is a logical incident of the Hamitic dual organization of society) since the *gudi* numbered four members, two from each side. The English introduction of a fifth member, who was agreed upon by both parties as an impartial arbitrator, was a real contribution to the settlement of disputes, since with five there was always bound to be a majority on one side or the other. This committee of five was called a *panch*, as a shortened form of the Hindustani word "panchayat" — a village council of five members. This derived naturally from the experience of officers in Indian administration since British Somaliland was, until 1898, under the India Office.

(8) I believe this "sexual" phraseology to be a relic of a not very distant period when the half-pagan Somalis practised sex mutilation as a matter of ritual custom as is still found among many of the Galla and Danakil tribes to-day. Stone phallic monuments are found from the area of Borama (*see* A. T. Curle "Carved Stones" *Antiquity*, September, 1937), to Borana and Kaffa north of Lake Rudolf. Mutilation of a defeated enemy rendered his avenging spirit powerless. The conqueror after purification wears the *qallaco* a phallic symbol on his forehead as the gage of victory and reinforced strength. *See* Bieber *Das Kaffa*, Vienna, and Plowman "Gedamoch Ceremonies," *J.R.A.I.* (?1913).

(9) The contrast between Islamic law (*sharia*) and local customary law (*adat—ga'ash* or *dastur*) is found all over the Islamic world.

(10) Doughty, in the glossary of *Arabia Deserta*, gives "Ana dakhilak"—"I become thy dakhil"; "el dakhil"—lit. "one who enters to another," i.e., being come as it were under his roof he requires protection. Similarly in Somali "*Magan ban kuahai*"—"I become thy *magan*," i.e., "one under protection."

(11) The word among the Southern Darod and in Northern Frontier District of Kenya is. I understand, "shegat" (Arabic).

(12) Does not this "*Aji*" link up with the "Ji" root meaning "the people" of the nilotic and hamito-nilotic tribes, e.g., of the "*Ajiye*" of Labwor Hills in Uganda, and of Mount Kathiangore in the Anglo-Egyptian Sudan? A few pronouns and numerals appear to be common to the Ji dialects and to Somali. Temperamentally, the nilote resembles the pastoral hamite more than the agricultural Bantu. While *Aji* in British Somaliland means people of stock-owner class, i.e., free Somali, in the Northern Frontier District of Kenya and in Borana Province of Ethiopia, it is used more vaguely to mean people of Somali extraction as opposed to negroes (Shankalla) or Amhara. It

is usually pronounced "Eji" in these southern regions. The step from this to "Ajiye" is insignificant, and my opinion is that in this area where the Sudanian-speaking negro tribes bordered on the Kushitic-speaking tribes and mixture took place, any who could claim to hamitic origin, did so. This may be a false etymological hypothesis, but it accords with the tradition of many of these border tribes as to their origin. The Rendille at the moment are an example in point of people in a transitional stage between the Somali and Nilotic type of culture.

As regards the outcaste Sab tribes. Their origin has been discussed by E. Cerulli in an article "L'Origine delle basse caste della Somalia" in *L'esplorazione Commerciale*, October, 1916, and in a very general discussion of the outcaste tribes of Ethiopia and the Horn of Africa contained as an appendix to his *Folk Literature of the Galla of Southern Abyssinia* reprinted by E. A. Hooton & Co. from *Harvard African Studies*, Vol. 111. He refers to R. Biasutti's article in the *Bulletin Soc. Geogr. Italiana*, Roma, 1905, Vol. 6, p. 175, which was the first attempt to make some broad generalizations as to these hunting tribes spread all over East Africa as far south as Tanganyika.

It does not appear, however, to have been noticed that exactly the same cultural distinctions of caste obtain in Arabia between the Arab and the outcaste tribes there as between the Somali and the Sab. I quote Doughty, *Arabia Deserta*, Vol. I, p. 324. "These alien and outcaste kindreds are of fairer looks than the hunger-bitten Beduw. The *Heteym* rich in small cattle, have food enough in the desert, and the *Solubba* of their hunting and gipsy labour: for they are tinkers of kettles and menders of arms in the Beduin menzils . . . They are beside wood-workers in the desert acacia timber of rude saddle trees for the burden-camels and of the thelul saddle frames, of pulley reels (*mahal*) for drawing at any deeper wells of the desert, also of rude milk vessels and other such husbandry beside they are cattle surgeons, and in all their trade (only ruder of skill) like the smith's caste or *Sunna*. The Solubba obey the precept of their patriarch, who forbade them to be cattle-keepers and bade them live of their hunting in the wilderness. Beduins, otherwise little nice, will not willingly drink after Solubbies that might have eaten of some fulis, or the thing that is dead of itself. Also the Beduw say of them, "they eat of vile insects and worms": the last is fable, they eat no such vermin. Rashly the evil tongue of the Beduw rates them as "*Kuffar*," because only a few Solubbies can say the formal prayers, the Beduins themselves are not better esteemed in the towns . . . Homeborn, yet have they no citizenship in the Peninsular. No Beduwy, they say, will rob a Solubby. This dispersed kindred of desert-men in Arabia, outgo the herdsmen Beduw in all landcraft, as much as these go before the tardy villagers. The Solubba (in all else ignorant wretches) have inherited a land-lore from sire to son, of the least finding-places of water. They wander upon the immense face of Arabia, from the height of Syria to el-Yemen, beyond et Taif, and I know not how much further! — and for things within their rat-like understanding, the Arabians tell me, it were of them that a man may best enquire. The *Solubba* or *Sleyb*, besides this proper name of their nation have some other which are epithets. West of Hayil they are more often called *el Khlua* or *Kheluiy*, "the desolate," because they dwell apart from the Kabail. They are called as well in the despiteful tongue of this country *Kilab el-Khala* "hounds of the wilderness." *El-Ghruneny* is the name of another kindred of the Sleyb in East Nejd; and it is said they marry not with the former. The Arabians suppose them all to be come of some old Kafir kind or Nasara. Neither are the Sherarat and Heteym nomads (which are of one blood) reckoned to the Beduin tribes. The

dispersed kindreds of Sunna are other home-born aliens living amongst the Arab and there is no marrying between any of them. "Ma li hum asl," says the Beduw, "they are not of lineage," which can be understood to signify that "not descended of Kahtan, neither of the stock of Ishmael, they are not of the Arabs." And if any Arabians be asked, what then are they? They answer: "Wellah, we cannot tell, but they come of evil kin, be it Yahud or Nasara."

Further south in the Hadhramaut, W. H. Ingrams has come on other explanation for these folk whose name in those parts is identical with that used in the Somalilands. The following quotation is from page 44 of his 1936 report on the Hadhramaut, published as Colonial Office paper No. 123/1937:—

> "The Subians form definitely the lowest class of the population. Some of them are agricultural labourers receiving wages or paid in kind, and there are settlements of them outside coastal towns like Mukalla and Shihr. When they are settled next door to a town they do the hewing of wood, the drawing of water, and perform such sanitary services as are carried out by sweepers in other eastern countries.
>
> "I was informed that the word 'Subian' comes from 'Sabi' a boy. In the Hadhramaut they originate from the Wadi Hajr, and for this reason in the western part of the Protectorate are known as Hajris. They are said to be the descendants of the Abyssinian invaders of the third to sixth centuries A.D., and to have been reduced to their present lowly estate after the Abyssinians had been routed by the Persians on the intervention of Seif bin Dhi Yazan. This is the tale told in the Hadhramaut, and d'Arnaud recounts a similar story as the origin of the Khadims of Yemen and Aden. Neither slaves nor Subians can be the subjects of blood feuds."

It is interesting that in Somaliland there should be a similar tradition of the defeat of the Midgan, who were at one time a free hunting tribe on the borders of Hargeisa District. They appear to be equivalent to the Arabian Solubbies, and the Somali Tomals to the Sunna mentioned by Doughty. The lowest caste of all in Somaliland, the Yibbirs, appears to have no analogous caste in Arabia. In addition to hunting and performing menial duties in the towns they have certain specialized functions in the manufacture of charms particularly for fertility. Their women usually perform the clitoridotomy operation on the young Aji girls and act as midwives when they bear children. They have a certain traditional perquisite in the gift of a sheep when the first Aji child of a family is born.

It is curious that each of these outcaste groups has an exogamous dual organization of its own. Thus the Midgans are divided into Musa Dirir and Madiban, the Tomals into Ismam Gulaid and Ambur Gulaid, and the Yibbirs into Galaan and Adaan.

(13) I had originally written "Galla tribes"; but changed it as likely to lead to confusion, since in physical type the Somalis differ very markedly from various "Galla" groups in Ethiopia some of whom have become crudely islamized. However, there appears to be throughout the Galla, Somali and Danakil groups a clear indication of a primitive exogamous dual organization of the tribes, which is still found among the Borana and in less degree among the Danakil, and in still less degree among the Somali.

Thus the Borana are divided into two cross-marrying groups of tribes, the Sabo and Gona, each with its chief, at present Gedo and Guyu Ana respectively: the Danakil are divided into the Adoimara and Assoimara groups each containing about 15 tribes, but strict cross-marriage is no longer practised. The Somali divisions

of Isahak and Darod are, I am convinced, but further examples of the same type of organization, which has been blurred and upset by contact with Islamic law and custom. The tradition of the arrival of Sheikh Isahak with 44 saints is curiously reminiscent of the Galla mythology in which Oglie and Atete (two subgods representing male and female principles) are each supported by 44 spirits. The idea of a Supreme Being whether Wak (Galla) or Allah (Somali Moslem) is identical. It would appear that the pagan Somali in pre-Islamic times were subjected to the same cultural influences as the Galla and developed on somewhat similar lines. Nevertheless, the "Galla" cairns called "talo" found in many parts of Somaliland all the way from Erigavo to the Northern Frontier District, coupled with the "Galla" wells seem to indicate co-operation from a rather larger group than is at present the normal Somali social unit. The present Somali grave is a small mound of earth or gravel with stones at the foot and head and a few stones set in rectangles at either side to indicate the number of children (even this latter is often omitted). This is a small labour compared with the great piled cairns some 50 yards long and 15 wide, which remain as the record of the Galla. A few clans are remembered as being of Galla origin though now grouped as Somali. Such are the Tur Yerr with the Dulbahanta Mohamed Gerad and among the Rer Musa Abokr, the Jebrahil among the Habr Yunis Rer Ainasheh, and the Gahaile in Erigavo. Some say that the Dulbahanta Khayad are Galla; but they themselves deny it furiously. Further south among such tribes as the Gurreh and the Rahanwen racial mixture is obvious from cultural, linguistic and physical indications. In general, in the north the references of the Somali to the people who occupied the country in early times are extremely vague. Even the tradition of the times of Imam Mohamed (Mohamed Gran) are almost entirely forgotten.

(14) A perusal of the confidential memorandum "Istruzione per l'applicazione dell ordinamento guidiziario" issued by the Direzione superiore degli affari politici, i.e., the legal branch of the Italian secretariat, provides an interesting contrast between British and Italian administrative methods. The emphasis is upon two points:—

(1) The decisions and procedure of native courts do not interest the central government until one party or another is left with a grievance and appeals. Residentes (District Officers) are advised to interfere as little as possible with the operations of native custom, and there is no occasion to take action at all if agreement between parties is reached in the native court.

(2) When a question is eventually brought up to the District Officer, which requires settlement regarding conflicting claims which concern native custom, it is the duty of the officer to define the parties, the claims, the customs, the opinions of native authorities, the arguments and objections and to suggest a solution but not to give a decision. This is the responsibility of the Governor at headquarters.

The Italian policy thus tended to diminish the local officer to a mere clerk and to pile up all authority at headquarters where judges and secretaries could not keep pace with the work and so got hopelessly behind hand. The cause for this policy was the absence of an Italian administrative class with traditions of probity and responsibility. The same desire to centralize control was also probably responsible for the tendency to diminish the authority of local chiefs by splitting up their areas, and encouraging the claims of rivals as a countercheck to the authority of any one man.

(15) *See* A. T. Curle. "The Ruined Towns of Somaliland," *Antiquity*, September, 1937. There are also a considerable number of additional

sites which he has not mentioned, for example, at Dirbiyo near Wadamugo on the Burao—Ainabo road, at Badwein, at Chetsalah near Badwein, Walamogi near Hudin, Kabur Ali near El Murir.

(16) The *tariqas* are religious fraternities of whom the Qadarieh Ahmedieh and Salihieh are the most important in Somaliland. They extend throughout Islam, but Lammens "Islam Beliefs and Institutions" remarks: "The tariqas have really flourished only among the intellectually backward and in regions where anarchy reigns."

(17) It must be realised that the method of grazing control is more likely to be successful if it be based on a policy of "keeping out" rather than "keeping in." What is meant by this is that it is quite impossible at times of extreme drought, as occasionally occur, to hold tribesmen within a fixed grazing area when the grazing and water are completely used up. That is the strict policy of "keeping in." The policy of "keeping out" is to encourage each tribe to close voluntarily for a period of two or more years a proportion of their grazing area, which, experience has shown, then tends to improve out of all recognition, and acts as a reserve for bad years. When I say "voluntarily," I mean with the approval of the chiefs and elders. There are always a proportion of anti-social individuals to whom compulsion must be applied to prevent them ruining things for the rest of the community. The value of the "keeping out" policy is shown by the generally much richer vegetation in the Haud and Ogaden than in the Ogo area. The two former areas were largely closed for long periods during the mullah wars between 1903 and 1920. Moreover, the fact that there are no wells on the Haud and flocks must depend on the rain-water ponds (*balis*), for water means that the Haud cannot be grazed during the dry season.

(18) It is possible that the Sultan of the Habr Yunis may have been able to absorb some of the profits from incense caravans moving from the Dagahbur region towards Zeila and Berbera, since Habr Yunis grazing lies across these routes.

SHORT GLOSSARY OF SOMALI WORDS OF IMPORTANCE IN SOCIAL RELATIONSHIPS.

It will be noted that while the language draws from Arabic for a number of its roots, it is itself capable of very fine distinctions of meaning particularly, of course, in names describing every possible variation of stock, of grazing and water. The glossary is arranged under subject headings for convenience of reference in the field. The indefinite article is attached by a hyphen to each word. Barry's *Elementary Somali Grammar* has been made use of as a check, and should be referred to for rules of elision in pronunciation, e.g., l+t=sh. Most of the words shown here are given in the exercises at various stages through that book, but a number of alternative Arabic and Darod words in common use have been added.

	Singular	Plural
FAMILY	*rer-ki*	*rero-hi*
man	*nin-ki*	*niman-ki*, or *rag-gi* (collect.)
woman	*nag-ti*	*nagoh-hi* or *dumar-ki* (collect.)
people	——	*dad-ki* (collect.)
boy	*wil-ki*	*wilal-ki*
girl	*gabad-di*	*gabdo-hi* or *hablo-hi* (collect.)

	Singular	Plural
wife	*afo-di*	*afoyin-ki*
child	*anug-gi* (Darod word) .	*arur-ti*
orphan	*agon-ki*	*agona-di*
youth	*nin dalinyer*	*dalinyero-oi*
old woman	*islan-ti* ...	*islano-hi*
old man	*islan-ki* ...	
elder	*odhe-gi*	*odheyal-ti*
father	*aba-hi*	*abayal-ti*
mother	*hoyo-di*	*hoyoyin-ki*
mother	*habr-ti*	*habroshin-ki*
parents	——	*wafed-ki*
son also child	*inan-ki* ...	*inamo-hi*
daughter	*inan-ti* ...	
brother	*walal-ki* ...	*walalo-di*
sister	*walal-ti* ...	
sept (i.e., group of families: subsection of clan)	*jilib-ki*	*jilibyo-di*
genealogy	*abtirsinyo-di*	——
descendants	——	*dal-ti*
blood	*dig-gi*	——
splitting up of sept or clan	*kalagur* or *kalatag* ...	——
close relation by blood	*ga'al-ki*	*ga'ala-di*
relation by blood ...	*higal-ki*	*higalo-di*
relation by marriage .	*hedid-ki*	*hedidye-di*
family by marriage (wife or husband speaking) ...	*has-ki*	——
father-in-law	*sodduk-ki*	*soddogyo-hi*
mother-in-law (wife's mother)	*soddo-di*	——
another man's wife ...	*soddo-di* ... ... identity of words here indicates strong tabu relationship	——
mother's sister ...	*habr yer-ti* ... ... (lit. little mother)	——
father's sister	*edu-di*	*edoyin-ki*
mother's brother ...	*abti-gi*	*abtiyalo-di* (whole of mother's family)
father's brother ...	*ader-ki*	*ilmo abti-gi*
mother's brother's son	*inan abti-gi*	*ilmo ader-ki*
father's brother's son .	*inan ader-ki*	——
mother's sister's son .	*habr wadak*	——

Note.—The *habr wadak* relationship is one of which the ordinary man makes constant use. Affection tends to follow the matrilineal line while property and social status the patrilineal line.

	SINGULAR	PLURAL
father's sister's son ...	*inan edu, inan abti-gi* .	*ilmo edu*
grandfather	*awo-gi*	——
grandmother	*ayeyu-di*	——
female descent ...	*ba* or *baha*	*ayeyuyin-ki*

Note.—These distinctions of *Ba* and *Baha* are important in polygamous families and are frequently employed in speech. "*Ba*" means all the descendants of one particular wife of a man. It is, therefore, invariably followed in speech by her name or the name of her clan. "*Baha*" means all the rest of the children of that man and is, therefore, followed by the man's name. Thus in the "Habr Yunis" tribe the patriarch Ainasha (from whom are descended the Rer Ainasha) married a Jebrahil woman whose two sons, Segulleh and Semater, had a large progeny. Thus they are known as the Habr Yunis *Ba* Jebrahil, while the remainder of the descendants of Ainasha by the other wives (the Ba Basala, Ba Moon, and Bura At) are lumped together as the Habr Yunis *Baha* Ainasha. For outline genealogies of the chief tribal groups of British Somaliland *see* Lt.-Col. R. H. Smith's *Tribes of British Somaliland* printed at Caxton Press, Aden, 1941.

	SINGULAR	PLURAL
POSSESSIONS (all sorts, including stock)	——	*adunki* or *nol-ki*
house (general word) .	*aqal-ki*	*aqalo-di*
house, mud and wattle flat-roofed	*arish-ki*	*arishyo-di*
house, stone or brick, limewash	*dar-ti*	*daro-hi*
house, matting tent or hut	*guri-gi*	*guryo-hi*

Note.—The connection between this word *Guri* (which used in connection with a man's name means "all his huts and chattels" hence by extension a village; while used with a woman's name it means "a single hut") and *Gur*—marriage. *Gurning* a related word means the packing and movement of the *guri* or caravan. *Gurso*—to marry means presumably literally "to get a house," or to "become a householder."

	SINGULAR	PLURAL
tent of a man or woman living in a group but referred to as distinct from that group, e.g., the hut of a *magan* living under protection, or of a wife living among her husband's relations (especially if he has two or more wives)	*gois-ki*	——

	Singular	Plural
solitary hut of a man with but one wife living alone in the bush	*jess-ki*	——
engaged man's hut near or outside his future father-in-law's kraal (this is where the courting is done and the bride's virginity examined) ...	*ardah-hi*	——
enclosure, camp ...	*hero-di*	*heroyin-ki*
enclosure for camels .	*od-di*	*odo-hi*
the sheep and goat enclosure in the middle of the homestead	*gulgul-ti*	——
CHATTELS (of all sorts other than stock)	——	*mot-ki*
goods, kit, baggage ...	——	*alabo-di*
hoop-like tent poles of banded withies to carry the cover mats —of two kinds ...	——	*digo* (large) *lol* (small)
mats for tents (*see* Note 2)		
leather skin for hut wall	*lama-di*	*lama-hi*
bed	*sarir-ti*	*sariro-hi*
blanket	*busta-hi*	*bustayal-ti*
bedding	——	*gogol-ti*
bedcover of silk ...	*toraha*	——
table	*mes-ki*	*mesas-ki*
decorated food container	*sattiyo-di* or *durban* .	*sattiyal-ti*
box	*sanduq-i*	*sanaduq-di*
key	*muftah-hi*	*muftahyo-di*
chair	*kursi-gi*	*kurasi-di*
hide of cattle or camel	*san-ti*	*sanan-ti*
skin of sheep or goat .	*harag-gi*	*haragyo-di*
waterpot (of wood or basket work) ...	*han-ki*	*hanan-ti*
ordinary bucket ...	*baldi-gi*	*baldiyal-ti*
water bucket (of leather for well drawing) ...	*wadan-ti*	——
rope	*hadig-gi*	——
fire	*dab-ki*	*dabab-ki*
firewood	——	*habo-di*
charcoal	——	*duhul-ti*
charcoal firestand of soft stone or pottery	*idan-ki* or *burjiko-hi* or *girgire-di*	——
incense vessel of soft stone or pottery ...	*dabkad-ki*	*dabkadyo-hi*
incense, expensive ...	*'ud*	——

	SINGULAR	PLURAL
incense, cheap ...	*luban*	——
empty tin	*dasad-di*	*dasado-hi*
spoon	*fandal-ki*	*fandalo-di*
cooking pot (iron) ...	*dis-ti* or *madiba* ...	*distye-di*
cooking pot (pottery) .	*deri-i*	*deryo-hi*
broom	*minfiq-i*	*minafiq-di*
axe	*fas-ki* or *gudino-di* ...	*fasas-ki*
dagger	*bilawa-hi* (Arabic) ...	*bilawayal-ti*
	able-di	*ablo-hi*
	turi-di	*turi-hi*
knife	*mindi-di* or *mandil-ki* .	*mindiyo-hi*
scabbard or sheath ...	*gal-ki*	*galal-ki*
comb	*saqaf-ti*	*saqafo-hi*
stock whip	*jedal-ki* or *shabuk-ki* (Arabic)	
walking stick	*ul-ti* or *bakhora* ... (Arabic)	*ulo-hi*
shepherd's crook ...	*hangol-ki*	*hangol-ti*
saddle for horse or camel	*kora-hi*	*koraval-ti*
saddle cloth	*shalmad-di*	*shalmado-hi*
bit or bridle	*hakama-hi* or *lijam* ... (Arabic)	*hakamayal-ti*
stirrup	*rakab-ki*	*rakabayal-ti*
feed-bag	*abud-di*	——
headstall	*shekamad-di*	*shekamado-hi*
saddle-tree of 2 crossed sticks on camel's withers to attach girth strap below and load above ...	*kal-ki*	*kalal-ti*
saddle-tree of 4 crossed sticks, 2 on withers and 2 on crupper used as above ...	*kabal-ki*	*kabalo-di*
wooden camel bell ...	*kor-ki*	*koror-ki*
CLOTHES (of cloth) .	——	*dar-ki*
clothes (of leather) women's	——	*duh-hi*
clothes (of leather) men's	——	*gairan-ki*
man's loincloth of green or red cloth from waist to ankle	*ma'wus-ki*	*ma'awis-ti*
cloak	*maro-di, tob* (Arabic), ½ *tob—goh-hi*	——
turban	*emamat*	——
foundation cap for turban	*kulet*	——
cheap cotton cloth ...	*mahmudi*	——
silk cloth	*hafuni*	——
shoe	*kab-ti* or *muda'is* ...	*kaboh-hi*
skirt	*gogora-ki*	*gogora-di*
smock	*korda-di*	*kordado-hi*
sheet used as chemise	*gareis-ki*	*gareisyo-hi*
belt (man's)	*sun-ki*	*suman-ti*

	Singular	Plural
belt (woman's) made of rope	*bokor-ki*	*bokoro-hi*
virgin's belt	*da'al-i*	*da'alo-hi*
cloth worn by women to cover hair ...	*magaram* or *mahabat*	*magarim*
necklace of gold (usual method of putting wealth on deposit), two types:		
(1) flat plates ...	*lazim*	——
(2) spherical engraved bobbles ...	*muriat*	——
FOOD	*sor-ti*	——
milk	——	*'ano-hi*
sour milk beer ...	——	*'ano danan*
meat	*hilib-ki*	——
ghee	*subag-gi*	——
sorghum, millet, dhurra or jowari ...	——	*hadud-di* or *masego-di*
dates	——	*timir-ti*
vegetables or fruit ...	*qotrad-di*	——
rice	*baris-ki*	*baris-ki*
fish	*kalun-ki*	*kalunyo-di*
egg	*ukun*	——
accursed object that cannot be eaten or touched (e.g., animal died of itself) ...	*bakti-gi* Arabic *haram*	——
MARRIAGE	*gur-ki*	——
circumcision of males and subincision and sewing up of females, done for both sexes between the ages of 7—12	——	*gudnin* or *buri*
virgin	*bikirat*	——
a girl looking for marriage	*herin-ti* or *wangurdon*	——
the arrangement ...	*farsomo-di*	——
betrothal payment (by fiancé to girl's father)	*gebati-gi*	——
an engaged girl ...	*wa donontahai inan-ti*	——
bride-price (payment by bridegroom to bride's father) ...	*yarad-ki*	*yaradye-di*
dowry (bride's father to bride)	*dibaad-di*	*dibaadye-di*
wedding	*aros-ki*	*arosye-di*
bridal cake of thrice boiled mince meat and spices	*mokumat-di*	*mokumadi-hi*
wedding present (from bridegroom to bride)	*marrin*	——
gift to mother-in-law .	*di'qo-di*	*di'qoyo-ki*

	Singular	Plural
marriage settlement on a woman by her husband	*mehr*	——
maintenance	*musuruf-ki*	——
pregnant	*riman-ti*	——
birth	*umul-ti*	*umulo-hi*
midwife	*umuliso-di*	*umulisoyin-ki*
menstruation	*'isu-di*	——
barren	*madales*	——
impotent	*gorbolan*	——
rape	*wa kubsadeye* ...	——
divorce	*furnin*	——
a woman separated from her husband by partial divorce .	*nakirad* or *nashiza* ...	——
a divorced woman ...	*aramal-ti*	——
a prostitute woman ...	*dillo-di*	——
gambling	*kamar*	——
vocal concert	*gabei*	——
minstrel	*gabai'a-gi*	——
song	*hess*	——
ululation by woman .	*mash herat*	——
dance	*ayar-ti*	——
drum	*gurban* or *tambur* ... (Arabic)	——
dancing clown (animal imitator)	*bar adda*	——
feast at conclusion of schooling or at marriage	*gelbis-ti*	——
show of horsemanship, dancing and singing	*dibaltig*	——
marriage feast ...	*makdarra*	——

"Makdarra" is a much developed institution for as at a wedding feast everyone is expected to give presents to the bridegroom, the word has become corrupted to mean any feast (i.e., a free supply of tea, a few cakes and incense) where the guests are subjected to a friendly black-mail to extract alms from them by playing on their fears of being thought mean. This is a very popular institution with the poor and equally unpopular with the wealthy. (As a result of public petitioning in Burao this institution was banned by public notice.)

	Singular	Plural
religious feast or birthday of the Prophet (a party of religious commemoration with hymn singing and tea drinking. It is often used as a cloak for the holding of a *makdarra* to give it a religious excuse) .	*maulid-di*	——
noise	*qailo-di*	——

	Singular	Plural
method of guessing good or bad luck by numerical calculation working on the rosary or with stones, often regarded as extremely powerful guide as to future action ...	*fal-ki* or *rame* (Arabic)	——
charm consisting of Koranic text sewn up in leather envelope .	*hersi-gi* or *karatas-ti* .	——
luck, good or bad ...	*nasib*	——
prayer	*salad-di*	——
washing before prayer	*weseysin* or *farahalo* .	——
water flask, usually of wood, carried by men for ceremonial washing	*weso-di* or *hulo-di* ...	——
prayer mat	*masali-di* or *sujjad-di* .	——
in general the whole series of words relating to the religion of Islam, have been absorbed practically unchanged into Somali usage, e.g., rosary	*tusbah-hi* or *tasbih-hi*	——
religious preacher or teacher	*wadad-ki* or *mullah-hi* (Arabic)	——
one who is in the process of becoming a mullah	*au-ki*	——
evening prayer custom of religious zealots who meet in the mosque and shout the name of Allah till they are frenzied	*dikri*	——
THE SEA	*bad-di*	——
sailor	*bahri-gi*	*bahri-di*
ship	*markab-ki*	*marakib-ti*
dhow	*doni-di*	*doniyo-hi*
rowing boat	*sehemad-di*	*sehemado-hi*
anchor	*burosin-ki*	*burosinyo-di*
coast	*heb-ki*	——
sail	*shirag-i*	*shirago-di*
harbour	*marso-di*	*marsoyin-ki*
pier	*deked-ki*	*dekedo-hi*
island	*gasirad-di*	*gasirado-hi*
wind	*dubail-ti*	——
COMMERCE	*biashara-di*	——
business	*amur-ti*	*amuro-hi*
earnings	*hogsi-gi*	——

	Singular	Plural
money	——	*la'ag-ti*
change	——	*nagad-ki*
contract	*heshis-ti*	*heshisyo-hi*
cost	*gana'-di*	——
account, bill	*hesab-ki*	*hesabo-di*
partner	*sharik-ki*	*shurukye-di*
buy	*ibso*	——
sell	*ibi*	——
the townsfolk	——	*rer magalo*
the nomads of the interior, country folk .	——	*rer miyi* or *badu* or *jangali*
trader	*bayamushteri-gi* ...	*bayamushteriyo-di*
broker	*dilal-ki*	*dilalin-ki*
loan	*amah-di*	——
shop	*das-ki* or *dukan-ki* ... (Arabic)	*dasas-ki*
balance weight, scales	*misan-ki*	——
pound weight	*rodol-ki* (*cf.* Arab measure of weight the rottle)	——
coffee or tea shop (Somalis chiefly drink tea)	*maqayad-di*	*maqayadi-hi*
debt (credit)	*qan-ki*	*qaman-ki*
interest on loan (prohibited by Moslem law)	*riba-di*	*riboh-hi*
wages	*mushaharo-di*	*mushaharoyin-ki*
advance of pay ...	*takadimad-di*	*takadimado-hi*
alms in the form of food or clothing to a *Sab* or destitute person	*def-ti*	*defye-di*
instalment	*hafto-di*	*haftoyin-ki*
protector of a *Sab* and hence by derivation protector of a trader in hostile country .	*aban-ki*	*abana-di*
protection	*ilali*	——
the stock as wealth ...	——	*holo-hi*
camel (general word) .	——	*gel-i*
male camel	*aur-ti*	*auro-hi*
riding camel	*rakub-ki*	*rakub-ti*
female camel	*hal-ti*	*halo-hi*
stallion camel	*bargub-ki*	*bargubo-hi*
castrated male camel with huge hump, fatted up for slaughter	*gol-ki*	*golol-ti*
barren female camel with huge hump, fatted up for slaughter	*gol-ti*	*golol-ti*
barren (stock) ...	*galof*	——

A list of about 50 words describing exactly the age, colouring, the type of every sort of camel is omitted, as they vary very much in each nomad confederacy.

	SINGULAR	PLURAL
cattle	——	*loh-hi*
bull	*dibi-gi*	*dibi-di*
cow	*sa-ti*	*sahi-hi*
sheep	——	*idoh-hi*
ram	*sumal-ki*	*sumalad-di*
male castrated sheep .	*wan-ki*	*wanan-ki*
young female sheep ...	*saben-ti*	*sabeni-hi*
breeding sheep (ewe) .	*lah-di*	*laho-hi*
hen	*doro*	——
cock	*dik*	——
goats	——	*riyo-hi*
billy goat	*urgi-gi*	*urgiyo-hi*
breeding female goat .	*ri-di*	*riyo-hi*
donkey, male (jack-ass)	*damer-ki*	*damero-di*
donkey, female (she-ass)	*damer-ti*	*damero-di*
mule, male	*bagal-ki*	——
mule, female	*bagal-ti*	——
horse	*faras-ki*	*farda-hi*
mare	*genyo-di*	*genyoyin-ki*
foot-track of man or animal	*rad-ki*	*radad-ki*
contract of hire of:		
one month's drinking of a camel's milk ...	*biltan*	——
one day's milk turn and turn about with the owner of the camel	*ashatan*	——
herding fee to *magan* for services rendered, or tip to a servant for his trouble	*ta'ab-ki* or *ajuro-di*	——
deposit of stock with *magan* by protector	*abal gud*	——
strayed stock	*badi-di*	——
reward for information leading to recovery of stock ...	*badifad-di*	*badifado-hi*
description of characteristics of an animal	——	*tilman-ti*
camel brand peculiar to each clan (sometimes used on gravestones—Ogaden custom)	*sumad-di*	——
journey	*safar-ki*	*safaro-di*
thirst	*harad*	——
grazing area of clan ...	*daq*	——
camelman	*aurkarale*	——
men's work of grazing camels far out on the steppe	*hergeye* or *fofi* ...	——
women's and children's work of grazing sheep and goats near home	*dajin*	——

	Singular	Plural
brushwood shelter from the wind ...	*duksi-gi*	——
the fly	*duqsi-gi*	——
the milking	*lisnin*	——
take the stock to water	*arori*	——
the watering at wells	*doulis*	——
to water stock ...	*worabis*	——
water	*biyo-hi**	——
watering party coming into the wells ...	*dan-ki*	*daman-ki*
watering trough of leather	*nar-ki*	——
well	*'el-ki*	——
rainwater pool ...	*bali-gi*	——
artificial pond or drinking trough of stone or cement ...	*barked-di*	——
wayside pool	*jiddan-ki*	——
flood water	*dad-ki*	——
place flooded by rain .	*doho-di*	——
bitter water (as of wells in Nogal valley)	*qadad-ki*	——
river or river bed ...	*tug-gi*	——
running water ...	*durdur-ki*	——
rain water	*hared-ki*	——
rain	*rob-ki*	——
sun	*qorah-di*	——
moon or month ...	*bil-ti* (crescent) ...	——
	dayah-hi (full) ...	——
star	*hedig-gi* ... ... (Arabic *najm*)	——

**Note.*—Similarity of root to Galla word *bishan*—water. The root *bi* is probably identical with the nilotic root *pi* for water found throughout nilotic and nilo-hamitic languages.

	Singular	Plural
THE COUNTRY ...	*dul-ki*	*dulul-ki*
the bush (general word)	*qain-ki*	——
district	*wadan-ki*	*wadano-di*
grass	——	*gedo-hi*
new grass after rain .	——	*dog-gi* or *nak*
dry grass or straw ...	——	*aus-ki*
drought	*abar-ti*	——
heat	*kulail-ki*	——
cold	*dahan-ti*	——
mud	——	*dobo-di*
dust	——	*sigo-di*
soil	——	*amud-di*
hill	*bur-ti*	*buro-hi*
low isolated hill in the plain	*gumbur-ti*	*gumburo-hi*
plain	*ban-ki*	*banan-ki*

	Singular	Plural
village	*bulo* or *karia* (Arabic) *guri-gi* (often used loosely in this sense)	——
group of hamlets, camped together ...	*degmo-di*	——
town	*magalo-di*	——
tented quarter of the town	*harfa-di*	——
road	*waddo-di*	*waddoyin-ki*
street	*surin-ki*	*surino-di*
track or path ...	*wadiqo-di*	*wadiqoyin-ki*
garden	*ber-ti*	——
WAR	*haraba-di*	——
attack	*werar*	——
fight	*dagal-ki*	——
to fight	*dirir* or *len*	——
feud	*ollad-di*	——
scout	*ilal-ki*	*ilalo-hi*
raid	*dulaan*	——
raiding party	*'oll*	——
provisions for journey	*je'isin-ki*	——
to graze horses by night, or to attack by night	*mir*	——
loot	*daa*	——
to loot stock	*afgub*	——
to slaughter by cutting throat	*gaura*	——
to kill	*dile*	——
weapon (singular or plural)	*hub-ki*	——
rifle	*banduq-i* (or *midfa'i*) .	*banaduq-di*
pistol	*tumujad-di*	*tumujado-hi*
bandolier	*shekad-di*	*shekado-hi*
bullet (singular or plural)	*risas-ti*	——
wound	*nabar-ki* or *quon-ti* ...	——
bloodthirsty	*digya'ab*	——
castrate	*dufan*	——
taking a man's life ...	*naf go-dei*	——
spear	*waran-ki*	——
shield	*gashan-ki*	——
the fighting men of the clan	*gashanqad-ki* ... (lit. "shield carriers")	——
a fighting alliance ...	*gashanbur* ... ... (lit. "big shield")	——
non-combatants of the clan (women and children)	——	*mato-di*
thief	*tug-gi*	*tugag-gi*
highway robber ...	*bud'ad-ki* (pronounced *barad-ki*) [lit. club (*bud*) white (*'ad*) because he sits in the white dust of the highway waiting for victims]	——

	Singular	Plural
peace embassy ...	*ergo-di*	——
peace meeting ...	*wa'ad* or *musalaha* ...	——
frontier	*had-ki*	*hadad-ki*
JUSTICE	*haq*	——
tribal court	*shir-ki*	——
custom	*her-ki*	——
elder, man of importance	*wayel-ki*	——
government headman .	*akil-ki*	——
assistant headman (one who answers questions)	*jawabdar-ki*	——
complainant of any sort	*mushtaki-gi*	——
to importune	*qatesin*	——
name	*maga-i*	*magayo-di*
judge, magistrate ...	*hakin-ki*	——
officer	*sirkal-ki*	*sirakil-ti*
constable or soldier ...	*askar-ki*	*askar-ti*
handcuffs	*hadbidi-gi*	——
plaintiff	*mudi'i-gi*	*mudi'iyal-ti*
defendant	*muda'ali-gi*	*muda'aliyal-ti*
witness	*marqati-gi*	*marqatiyal-ti*
interpreter	*turjoman-ki*	——
clerk	*karani-gi*	——
court case	*kes-ki* or *da'awad-di* .	——
to swear	*daro*	——
the truth	*run-ti*	——
the lie	*ben-ti*	——
to deny responsibility for an action which one has done, and it is known that one has done	*dafir*	——
to have something against a person ...	*kugaudi*	——
to worry maliciously .	*adib*	——
advice	*talo-di*	——
a slap in the face ...	*dirbah*	——
honour, reputation ...	*namus* or *heshimat* ... (Arabic)	——
compensation as apology for insult ...	*haal*	——
accidentally	*kama'*	——
purposely	*baded*	——
question	*sual-ti*	*sualo-hi*
answer	*jawab-ti*	*jawabo-hi*
judgment	*hukum-ki*	——
punishment	*taqsir-ti*	——
fine	*qasirad-di*	——
prison	*habsi-gi*	*habsi-di*
the whip for flogging .	*kurbash-ki*	——
compensation for wounding	*jaifo*	——
blood money	*mag* or *diya* (Arabic)	——
full blood money (100 camels)	*mag dan*	——

	Singular	Plural
woman's blood money (50 camels) ...	*mag nagod*	—
close relatives share (of payment or receipt) of blood money	*jiffo*	—
distant relatives' share	*gobane*	—
standard value camel (worth nine female sheep)	*sagali*	—
written petition (one of the unfortunate legacies of Indian administration ...	*erji-gi*	—
DEATH	*demasho*	—
grave	*hawal-ti* or *habal-ti* ...	—
corpse	*mayid-ki*	—
prayer for dead at departing	*sura yassin*	—
bury	*'as*	—
shroud	*kafan*	—
headstones	*geiski habasha* ...	—
wailing	*owehin*	—
inheritance	*dahal*	—
mortmain (religious gift to assist maintenance of a mosque or tariqa)	*waqf*	—
PLACES. (Somali names for well-known places which differ from the usual.)		
Berbera	*Sahil* (lit. Coast)	
Harar	*Adari* or *Adali*	
Mogadishu	*Hamar*	
Bandar Kassim ...	*Busaso*	
Aden (Steamer Point)	*Tawali*	

NOTES ON THE *FALCONIDAE* IN THE CORYNDON MEMORIAL MUSEUM.

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(BY PERMISSION OF THE TRUSTEES.)

The object of these notes on *Falconidae* in the Coryndon Museum is to make available to other workers data based upon this collection, especially in respect of the distribution of species, as in many cases there are specimens from localities not recorded by Dr. van Someren (1922 and 1932), or by Sir Frederick Jackson (1938). Birds collected, in 1942, are not included.*

GENUS *Falco*.

(1) *Falco peregrinus perconfusus* Collin and Hartert.
African Peregrine. .... One specimen.
A juvenile female collected at Ruiru, Kenya, by M. P. Seth-Smith, *circa* 1914. Wing 310 mm. (New locality record.)

(2) *Falco biarmicus biarmicus* Temminck.
South African Lanner. .... One specimen.
A juvenile male collected at Apis Rock, South-East Serengeti Plains, Tanganyika, by L. S. B. Leakey, on 3/9/32. Wing 281 mm. (*Note.*—Much smaller than recorded males of this species and possibly a new sub-species.)

(3) *Falco biarmicus abyssinicus* Neumann.
Abyssinian Lanner. .... No specimen.

(4) *Falco subbuteo subbuteo* Linn.
European Hobby. .... One specimen.
A male (mounted) collected at Naivasha, Kenya, by H. J. A. Turner. No other data. (New locality record.)

(5) *Falco cuvieri* Smith.
African Hobby. .... Five specimens.
A male (mounted) collected at Nairobi, Kenya, by H. J. A. Turner in July, 1911. No other data.
A male collected at Kampala, Uganda, by E. S. Subuga, on 1/3/40. Wing 225 mm.

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* The author wishes to express his thanks to Sir Charles Belcher, K.C.M.G., Captain Miles North, and Dr. D. G. MacInnes for assistance in the preparation of these notes.

Members of the Society are urged to assist in collecting material representing the species of which there are either no or very few specimens in the Museum.

A male collected by A. M. Champion at Kapsabet, Kenya, on 13/10/37. Wing 230 mm. (New locality record.)

A female collected at Kapenguria, Kenya, by A. M. Champion, on 12/10/37. Wing 240 mm. (New locality record.)

A female collected at Kapsabet, Kenya, by A. M. Champion, on 12/10/37. Wing 252 mm.

(6) *Falco fasciinucha* Reich. and Reum.

Teita Hobby. .... No specimen.

(7) *Falco concolor* Temminck.

Sooty Falcon. .... No specimen.

(8) *Falco chicquera ruficollis* Swainson.

Rufous-necked Falcon. .... Two specimens.

A juvenile male collected at Kilifi, Kenya, by M. E. W. North. Wing 230 mm. (A new locality record.)

A female collected by A. M. Champion at Limpete, Lake Rukwa, Tanganyika, on 9/7/38. Wing 195 mm.

Note.—The juvenile male shot by M. E. W. North has a wing measurement which equals that given for females by Jackson while the female shot by A. M. Champion has a measurement only equal to the male measurements given by the same authority, but as both these collectors are very careful about sexing their specimens one hesitates to suggest that the sexing is wrong.

(9) *Falco tinnunculus tinnunculus* Linn.

European Kestrel. .... Twenty specimens.

A male (mounted) collected at Naivasha. No other data.

A male in adult plumage collected by G. H. Hopkins at Njoro, Kenya, on 11/1/37. Wing 250 mm. (New locality record.)

A male in adult plumage collected at Rusinga Island, Lake Victoria, Kenya, by G. Bell, on 16/2/35. Wing 239 mm. (New locality record.)

A male in adult plumage collected at Busia, Kenya, by G. H. Hopkins, on 19/12/36. Wing 245 mm. (New locality record.)

A male in juvenile plumage collected at Kanjera, Lake Victoria, by L. S. B. Leakey, on 15/3/32. Wing 240 mm. (New locality record.)

A male in juvenile plumage from Lumbo, Portuguese East Africa. No other data. Wing 232 mm.

One male in juvenile plumage collected in Nairobi, on 31/3/17. No other data. Wing 242 mm.

One male in juvenile plumage collected at Morogoro, Tanganyika, by A. Loveridge, on 4/2/18. Wing 250 mm.

Two males in juvenile plumage collected by J. Cushney at Lumbwa, Kenya, in December, 1913. Wings 244 mm. and 243 mm. respectively. (New locality record.)

One male in juvenile plumage collected by H. G. Hopkins at Limuru, Kenya. No date. Wing 247 mm.

One male in juvenile plumage collected by A. M. Champion at Kapenguria, Kenya, on 23/3/33. Wing 235 mm. (New locality record.)

One female collected by G. H. Hopkins at Jinja, Uganda, on 13/1/37. Wing 251 mm. (New locality record.)

One female collected at Nairobi, Kenya, by G. R. van Someren, on 17/3/35. (Shot from a migration of about seventy birds.) Wing 251 mm.

One female collected by G. R. van Someren at Ngong, Kenya, on 12/3/35. Wing 250 mm.

One female collected by A. L. Loveridge at Morogoro, Tanganyika, on 4/1/18. Wing 254 mm.

One female collected by L. S. B. Leakey at Kamuthanga, Kenya, on 26/2/41. Wing 250 mm.

One female collected at Dodoma, Tanganyika, on 6/12/40. No other data. Wing 248 mm.

One female collected by H. G. Hopkins at Molo, Kenya, on 21/12/36. Wing 258 mm. (New locality record.)

One female collected by R. L. Harger, near Nairobi, on 26/12/31. Wing 248 mm.

(10) *Falco tinnunculus* near *carlo* (Hart. and Neum.).
African Mountain Kestrel
(local variant). .... Two specimens.

One male (mounted) collected by L. S. B. Leakey at Oldoway Gorge, South-East Serengeti, Tanganyika, from a pair that were nesting on a rock ledge, on 25/8/41. Wing 232 mm.

One female collected by L. S. B. Leakey from a pair nesting on a ledge in a small cliff at Kikuyu Escarpment, on 8/8/32. (Clutch of four eggs taken.) Wing 220 mm.

Notes.—These two specimens, both of which were collected from nesting pairs in the month of August, are possibly true examples of *F. tinnunculus carlo,* but the female is somewhat smaller than this species is supposed to be and, moreover, they differ from the only specimen of the species that this Museum possesses from Abyssinia, the country from which this species was originally described.

For the time being these two specimens are, therefore, described as "near *carlo*" and not as "*carlo.*"

It is very possible that when more material has been collected it will be necessary to make a new sub-species.

(11) *Falco tinnunculus carlo* (Hart. and Neum.).

African Mountain Kestrel. .... One specimen.

A female collected by A. Buchanan at Debra Marcos, Abyssinia, on 23/6/41. Wing 244 mm.

This specimen appears to be a true example of *F. tinnunculus carlo* and it differs from the female found breeding on the Kikuyu Escarpment, in having spotted thighs, much darker breast, very much darker upper parts, and in being much larger. (Wing 243 mm., as against 220 mm. in the Kenya female.)

(12) *Falco rupicoloides arthuri* (Gurney.).

Larger East African Kestrel. .... One specimen.

A female (mounted) collected by L. S. B. Leakey from a nesting pair (clutch of four eggs taken) near Machakos, Kenya, on 17/5/41. The nest was in an isolated thorn tree on the open plains and about 20 feet above the ground. Wing 254 mm.

(13) *Falco naumanni naumanni* Fleischer.

Western Lesser Kestrel. .... Four specimens.

A male collected by A. M. Champion at Kapenguria, Kenya, on 3/4/33. Wing 220 mm. (New locality record.)

A male collected by E. H. Ward on the Kinangop Plateau, Kenya, on 8/3/28. Wing 230 mm. (New locality record.)

A male collected by A. Fischer at Nairobi, Kenya, on 3/3/12. Wing 238 mm.

A female collected by A. Fischer at Nairobi, Kenya, on 3/3/12. Wing 230 mm.

(14) *Falco naumanni pekinensis* Swinhoe.

Eastern Lesser Kestrel. .... No specimen.

(15) *Falco amurensis* Radde.

Eastern Red-legged Kestrel. .... No specimen.

(16) *Falco ardosiaceus* Bonne. and Vieil.

Grey Kestrel. .... No specimen.

(17) *Falco* (species indet.). .... One specimen.

A male kestrel collected by L. S. B. Leakey at Kanjera, Kendu Bay, Kenya, on 17/12/34. Wing 240 mm.

This specimen at first sight seems to be a female example of *F. tinnunculus tinnunculus,* but it cannot be even an immature wrongly sexed specimen of this species, as it had a greyish-white eye and not a brown eye.

Of the white-eyed kestrels, it is not *F. rupicoloides arthuri* since its tail is rufous with about ten bars and not bluish-grey with about six bars as in *arthuri.*

It may possibly be *Falco rupicoloides fieldi,* but I have no description of this sub-species available and do not know what is the colour of the tail.

(18) *Falco* (species indet. No. 2). .... Two specimens.

A pair. These two birds were collected by H. G. Hopkins at Laropi, West Madi, Uganda, on 3/3/37. They closely resemble *Falco tinnunculus tinnunculus* in most respects, but the male, which is in full plumage, has much darker thighs than in the latter species as represented in this collection, and in addition to this the thighs are markedly spotted. The female specimen differs from the females of *F. tinnunculus tinnunculus* in having the tail much less conspicuously barred. These two birds are definitely not *F. tinnunculus carlo*.

GENUS *Poliohierax*.

(19) *Poliohierax semitorquatus castanotus* (Heuglin).

Abyssinian Pygmy Falcon. .... Five specimens.

One female (mounted) collected by A. B. Percival at Simba, Kenya, on 16/11/08.

One male collected by D. G. MacInnes at Loruk, Baringo, Kenya, on 1/2/38. Wing 117 mm. (New locality record.)

One male collected by E. H. Ward at Ngare Ndare, North of Mount Kenya, Kenya, on 22/2/33. Wing 118 mm. (New locality record.)

One female collected by A. M. Champion at Karuao River, West Suk, Kenya, in August, 1936. Wing 119 mm. (New locality record.)

One female collected at Moroto, Uganda. No other data. Wing 113 mm. (New locality record.)

GENUS *Aviceda*.

(20) *Aviceda cuculoides verreauxi* Lafresnaye.

South African Cuckoo-falcon. .... Five specimens.

One male (mounted) collected by J. Crighton at Nairobi, Kenya, in August, 1912.

One female in juvenile plumage (mounted) collected by H. Maingot at Nairobi, Kenya, on 27/9/41.

One male collected by C. G. MacArthur in the Karura Forest, near Nairobi, Kenya, in November, 1939. Wing 300 mm.

One female collected by G. V. L. van Someren at Ngong, Kenya, in July, 1939. Wing 295 mm.

One specimen without any data. Wing 285 mm.

GENUS *Chelictinia*.

(21) *Chelictinia ricourii* (Vieil. and Oud.).

African Swallow-tailed Kite. .... One specimen.

One male collected by D. G. MacInnes at Ferguson Gulf, Lake Rudolf, Kenya, on 14/4/34. Wing 237 mm.

Genus *Milvus*.

(22) *Milvus migrans migrans* (Boddaert).

Black Kite. .... Two specimens.

One female (mounted) collected in Nairobi by Sanders on 3/11/41.

One unsexed specimen collected by H. G. Hopkins at Laropi, West Nile, Uganda. Wing 438 mm.

(23) *Milvus migrans aegyptius* (Gmelin).

Egyptian Kite. .... One specimen.

A female (mounted) collected by T. Fletcher at Nairobi, Kenya, in December, 1941.

(24) *Milvus migrans parasitus* (Daudin).

African Kite. .... Fourteen specimens.

One specimen (mounted). No data.

Two males collected at Morogoro, Tanganyika, by A. Loveridge, on 30/11/17. Wings 420 mm. and 425 mm.

One male collected by A. Loveridge, west of Mount Kenya, Kenya, on 22/11/15. Wing 410 mm.

Two males collected by D. G. MacInnes at Lokitung, Lake Rudolf, Kenya, on 15/3/34. Wings 420 mm. and 410 mm.

One male collected at Kanjera, Lake Victoria, Kenya, on 18/2/32, by L. S. B. Leakey. Wing 420 mm.

One male collected by H. Maingot at Nairobi, in 1941. Wing 395 mm.

One male collected by L. S. B. Leakey at Kendu Bay, Lake Victoria, Kenya, on 22/3/32. Wing 390 mm.

One female collected by L. S. B. Leakey at Kendu Bay, Lake Victoria, Kenya, on 22/3/32, (pair with above specimen). Wing 415 mm.

One female collected by A. M. Champion, near Kitui, Kenya, on 7/1/38. Wing 425 mm.

One unsexed specimen collected by A. Loveridge at Morogoro, Tanganyika, on 28/2/18. Wing 420 mm.

Two specimens without data.

(25) *Milvus* (*milvus* sub-species indet.). .... One specimen.

One female collected by A. M. Champion at Kamasia, Kenya, on 24/9/33. Wing 465 mm. Length about 598 mm. (measured before skinning). This bird which is indubitably a kite does not conform to any of the sub-species of *Milvus migrans*. It would appear to stand nearer to *Milvus milvus* (in immature plumage) and may possibly prove to be a sub-species of that kite. A description of it is as follows: —

General colour of the upper parts brown, upper-tail and upper-wing coverts lighter brown and each feather tipped with dirty-white. Top of head, neck and nape, each feather

whitish edged with brown and with a dark brown shaft-streak. Above each eye a dark brown, almost black, narrow eye-brow. Ear coverts brown. Throat dirty-yellowish white. Neck and breast, each feather yellowish-white edged with brown on the sides. Abdomen, thighs and under-tail coverts tawny-brown, each feather white at base and yellowish-white at tips. General colour of primaries brown; but much darker and almost black at tips. Each primary with a patch of white on the inner web which also affects the quill. This white patch ends on each primary about 25 mm. before the notch on the inner web. The tail feathers are brown above and much paler brownish-grey below. The inner web of each tail feather being paler than the outer web. Faint traces of barring are visible on the tail both above and below. Iris brown, bill dark horny black, feet dirty-ivory, claws black. Tarsus feathered on upper half in front bare part of tarsus with large transverse scutes in front and covered with small scales behind, these extending right up to junction with tibia.

Genus *Elanus*.

(26) *Elanus caeruleus caeruleus* (Desfontaines).

Black-shouldered Kite. .... Twenty-two specimens.

Three (mounted), a male, a female, and a juvenile collected at Naivasha, Kenya, by H. J. Allen Turner.

One male collected by G. R. C. van Someren in July, 1934. Wing 265 mm. (New locality record.)

One male collected in Nairobi, Kenya, on 28/9/38. No other data. Wing 265 mm.

One male collected near Nairobi, Kenya, on 3/12/15, by W. C. Johnson. Wing 273 mm.

One male collected by A. M. Champion at Nairobi, Kenya, on 9/2/38. Wing 258 mm.

One male collected by A. Loveridge at Morogoro, Tanganyika, on 6/6/17. Wing 257 mm.

One male collected by H. Maingot at Nairobi, in December, 1940. Wing 274 mm.

One male collected at Kampala, Uganda, by H. G. Hopkins, on 24/1/37. Wing 268 mm.

One female collected at Ngong, Kenya, in July, 1934. No collector's name. Wing 275 mm.

One female collected at Naivasha, Kenya, by H. J. Allen Turner. Wing 261 mm.

One female collected by L. G. van Someren at Nairobi, Kenya, on 18/3/38. Wing 260 mm.

One female collected by H. G. Hopkins at Limuru, Kenya, on 5/1/37. Wing 269 mm.

One female collected by H. G. Hopkins at Kampala, Uganda, on 6/9/37. Wing 269 mm.

One female collected by H. G. Hopkins in Kavirondo country, on 5/2/40. Wing 264 mm.

One unsexed specimen collected by H. G. Hopkins at Kikuyu Escarpment, on 1/1/37. Wing 265 mm. (New locality record.)

One unsexed specimen collected at Equator Farm, Kenya, in July, 1925. Wing 260 mm.

One unsexed specimen collected by A. M. Champion at Nairobi, Kenya, on 2/3/38. Wing 248 mm.

One specimen without any data.

Two nestlings without any data.

Genus *Machaerhamphus.*

(27) *Machaerhamphus anderssoni* (Gurney).

Bat-eating Buzzard or Andersson's Pern. No specimen.

Genus *Pernis.*

(28) *Pernis apivorus apivorus* (Linn.)

Honey-buzzard. .... One specimen.

One specimen (mounted) from Kabete, Kenya. Collected by D. G. McInnes in April, 1938. (New locality record.)

Genus *Aquila.*

(29) *Aquila verreauxi* Lesson.

Verreaux's Eagle. .... No specimen.

(30) *Aquila nipalensis orientalis* Cabanis.

Western Steppe Eagle. .... Two specimens.

One male (mounted) collected by L. S. B. Leakey at Naivasha, Kenya, on 29/11/41. Wing 530 mm.

One specimen (probably female) without any data. Wing 570 mm.

(31) *Aquila rapax raptor* A. E. Brehm.

Abyssinian Tawny Eagle. .... Two specimens.

One female (mounted) collected by H. J. Allen Turner on the Athi Plains, near Nairobi, Kenya, in December, 1912.

One male ? collected by A. Loveridge at Dodoma, Tanganyika, on 6/12/18. Wing 550 mm.

Note.—If the sexing was right then this wing measurement far exceeds normal male measurements, even for a female it is large.

(32) *Aquila pomarina* C. L. Brehm.

Lesser Spotted Eagle. .... No specimen.

(33) *Aquila wahlbergi* Sundevall.

Wahlberg's Eagle. .... Two specimens.

One female collected by Dr. Spurrier in Nairobi, on 10/4/12. Wing 440 mm. (New locality record.) This specimen was wrongly catalogued in the Museum Records as *Buteo desertorum!!*

One specimen without any data at all, but probably male. Wing 412 mm.

GENUS *Hieraaëtus*.

(34) *Hieraaëtus spilogaster* (Bonaparte).

African Hawk-eagle. .... Three specimens.

One male and one female collected by C. Moreau in a forest clearing at Amani, Tanganyika. The male was collected on 1/11/38, wing 405 mm.; and the female on 5/8/37, wing 425 mm.

One immature bird (unsexed) in brown plumage, collected at Maragua, Fort Hall, Kenya, on 24/1/34, by A. J. W. Reed, while attacking fowls. Wing 432 mm. (New locality record.)

(35) *Hieraaëtus ayresi* (Gurney).

Ayre's Eagle. .... One specimen.

One male (mounted) collected at Nyeri, Kenya, by L. S. B. Leakey, in December, 1941. Wing 349 mm. (New locality record.)

(36) *Hieraaëtus pennatus* (Gmelin).

Booted Eagle. .... No specimen.

GENUS *Polemaëtus*.

(37) *Polemaëtus bellicosus* (Daudin).

Martial Eagle. .... Four specimens.

One female (mounted) collected by L. S. B. Leakey at Karura Forest, Nairobi, Kenya, in September, 1941.

One male juvenile (mounted) collected by L. S. B. Leakey at Karura Forest, Nairobi, Kenya, in August, 1941.

One female collected by A. B. Percival at Chandler's Falls, Guaso Nyiro, Kenya, on 20/1/11. Wing 630 mm. (New locality record.)

One juvenile. No data. Wing 632 mm.

GENUS *Stephanoaëtus*.

(38) *Stephanoaëtus coronatus* (Linn.).

Crowned Hawk-eagle. .... Three specimens.

One male (mounted) collected at Dagoretti, near Nairobi, Kenya, on 26/10/11, by H. J. Allen Turner.

One male, juvenile, (mounted) collected by L. S. B. Leakey at Embu, Kenya, in April, 1941. (New locality record.)

One female, collected with two eggs, in September, 1936, on the Elgeyo Escarpment, Kenya. No collector's name. Wing 540 mm. (New locality record.)

GENUS *Lophaëtus*.

(39) *Lophaëtus occipitalis* (Daudin).

African Long-crested Hawk-eagle. Fourteen specimens.

One male (mounted) collected by H. J. Allen Turner at Nairobi, Kenya, in August, 1912.

One male collected by H. J. Allen Turner at Yala River, Kenya, on 5/10/15. Wing 370 mm.

One male collected by H. J. Allen Turner at Yala River, Kenya, on 16/10/15. Wing 365 mm. (New locality record.)

One male collected by H. Maingot at Nairobi, Kenya, in April, 1941. Wing 378 mm.

One male collected at Kikuyu, Kenya, by "Ishmael," in August, 1936. Wing 376 mm. (New locality record.)

One male collected by R. G. van Someren at Ngong, Kenya, in July, 1934. Wing 395 mm (New locality record.)

One male collected by H. G. Hopkins at Limuru, Kenya, on 9/1/37. Wing 393 mm. (New locality record.)

One male collected at Equator Farm, Kenya, in July, 1923. No other data. Wing 378 mm. (New locality record.)

Two females collected at Equator Farm, Kenya, in July, 1925. No other data. Wings 373 mm. and 358 mm.

One female collected by H. J. Allen Turner at Yala River, Kenya, on 20/10/15. Wing 384 mm.

One female collected by H. J. Allen Turner at Yala River, Kenya, on 16/10/15. Wing 372 mm.

One female collected by S. A. Neave at Meru, Kenya, on 14/2/11. Wing 380 mm. (New locality record.)

One specimen. No data. Wing 375 mm.

Note.—Many of these specimens have a much smaller wing-measurement than that given by Jackson (390 mm.) and some are even smaller than the smallest South African specimen (wing 375 mm.). The Kenya lowest limit is 358 mm.

Genus *Kaupifalco.*

(40) *Kaupifalco monogrammicus meridionalis* (Hartlaub).
Lizard Buzzard. .... Fourteen specimens.

One (mounted) male collected near Nairobi, Kenya. No other data.

One (mounted) female collected at Ikutha, Kenya, in January, 1942. (New locality record.)

Two males collected at Mesahubu, Kenya, on 18/3/31. No other data. Wings 220 mm. and 218 mm. (New locality record.)

One male collected by H. J. Allen Turner at Mombasa, Kenya, on 30/3/16. Wing 210 mm.

One male collected by A. M. Champion at Ikoo, Kitui, Kenya, on 6/1/38. Wing 200 mm. (New locality record.)

One female collected by H. J. Allen Turner at Sokoke, Kenya, on 1/7/32. Wing 220 mm. (New locality record.)

One female collected at Lenda, Kenya, on 22/3/31. No other data. Wing 220 mm. (New locality record.)

Two females collected at Lamu, Kenya, on 5/4/16, by H. J. Allen Turner. Wing 217 mm. and 210 mm.

One female collected at Bura, Tana River, Kenya, on 16/3/31. No other data. Wing 232 mm. (New locality record.)

One female collected at Ikoo, Kitui, Kenya, by A. M. Champion, on 6/1/38. Wing 180 mm.

One female collected at Jebir, Kenya, in July, 1922. No other data. Wing 232 mm. (New locality record.)

One unsexed specimen collected by G. R. van Someren at Nairobi, Kenya, on 20/7/38. Wing 212 mm.

GENUS *Circaëtus*.

(41) *Circaëtus cinereus* Vieillot.

Brown Harrier-eagle. .... Two specimens.

One unsexed specimen (mounted) collected by L. S. B. Leakey at Kanam, Kavirondo Gulf, Kenya, in 1932. (New locality record.)

One female collected at Gendia, Kendu Bay, Kenya, by D. G. MacInnes, on 7/6/32. Wing 525 mm. (New locality record.)

(42) *Circaëtus pectoralis* A. Smith.

Black-breasted Harrier-eagle. .... Four specimens.

One immature specimen (mounted) in brown plumage. Collected at Nairobi by H. J. Allen Turner. No other data.

One female collected at Zombe, Kitui, Kenya, by A. M. Champion on 12/1/38. Wing 523 mm. (New locality record.)

One female collected at Kanam, Kavirondo Gulf, Kenya, on 29/5/32, by L. S. B. Leakey. Wing 535 mm. (New locality record.)

One specimen collected at Nairobi, Kenya, in September, 1933. No other data. Wing 525 mm.

(43) *Circaëtus cinerescens* J. W. v. Müller.

Lesser Banded Harrier-eagle. .... No specimen.

GENUS *Butastur*.

(44) *Butastur rufipennis* (Sundevall).

Grasshopper Buzzard-eagle. .... Three specimens.

One male and one female collected by A. Loveridge at Dodoma, Tanganyika, on 22/12/18. Wings 305 mm. and 315 mm.

One specimen without data. Wing 305 mm.

GENUS *Terathopius*.

(45) *Terathopius ecaudatus* (Daudin).

Bateleur. .... Six specimens.

One specimen (mounted) collected at Nairobi. No other data.

One male collected at Lodwar, Lake Rudolf, Kenya, by D. G. MacInnes, on 7/6/34. Wing 510 mm.

One male collected by H. J. Allen Turner at Yala River, Kenya, on 10/10/15. Wing 540 mm. (New locality record.)

One male juvenile collected by H. J. Allen Turner at Thika, Kenya, in October, 1914. Wing 498 mm. (New locality record.)

One unsexed specimen collected by L. S. B. Leakey at Kanjera, Kavirondo Gulf, Kenya, in April, 1935. Wing 532 mm. (New locality record.)

One specimen without data. Wing 518 mm.

GENUS *Cuncuma.*

(46) *Cuncuma vocifer* (Daudin).

African Fish Eagle. .... Four specimens.

One male (mounted) collected by L. S. B. Leakey at Kanjera, Kavirondo Gulf, Kenya, on 28/12/41. (New locality record.)

One female collected by D. G. MacInnes at Seme, Kavirondo Gulf, Kenya, on 9/6/32. Wing 592 mm. (New locality record.)

One female collected by D. G. MacInnes at Kanjera, Kavirondo Gulf, Kenya, on 1/4/32. Wing 598 mm.

One female. No other data. Wing 595 mm.

GENUS *Gypohierax.*

(47) *Gypohierax angolensis* (Gmelin).

Vulturine Fish Eagle. .... No specimen.

GENUS *Gypaëtus.*

(48) *Gyaëtus barbatus meridionalis* Keyserl. and Blas.

African Lämmergeyer. .... No specimen.

GENUS *Buteo.*

(49) *Buteo buteo vulpinus* (Gloger).

Steppe Buzzard. .... Five specimens.

One male (mounted) collected by L. S. B. Leakey at Njoro, Kenya, in January, 1942.

One male collected by H. J. Allen Turner at Yala River, Kenya, on 10/10/15. Wing 368 mm.

One male collected by H. J. Allen Turner at Yala River, Kenya, on 14/10/15. Wing 358 mm.

One female collected by H. J. Allen Turner at Yala River, Kenya, on 10/10/15. Wing 346 mm.

One unsexed specimen collected at Gulu, Uganda, by H. G. Hopkins, on 13/6/36. Wing 370 mm. (New locality record.)

(50) *Buteo rufofuscus augur* Rüppell.

Augur Buzzard. .... Thirty-one specimens.

One male (mounted) (melanistic form) collected by L. S. B. Leakey at Kinangop, Kenya, while in act of mating with a normal type female, in July, 1941.

One female (mounted) collected by H. J. Allen Turner at Nairobi, in November, 1912.

One male collected by T. W. Chorley at Bukude, Kigezi, Uganda, on 12/7/40. Wing 392 mm. (New locality record.)

One male collected at Uplands, Kenya, on 28/3/22. No other data. Wing 405 mm. (New locality record.)

One male collected by H. G. Hopkins at Limuru, Kenya, on 2/1/37. Wing 398 mm. (New locality record.)

One male collected by E. H. Ward at Kinangop, Kenya, (8,300 feet), on 6/8/37. Wing 410 mm. (New locality record.)

Two males collected by R. G. van Someren at Ngong, Kenya, in July 1934. Wings 454 mm. and 430 mm. (New locality record.)

One male collected by C. Jolly at Nairobi, Kenya, on 12/7/15. Wing 412 mm.

One male collected by D. G. MacInnes at Kabete, Kenya, in April, 1939. Wing 396 mm. (New locality record.)

One male collected by L. S. B. Leakey at Kijabe, Kenya, on 19/6/41. Wing 420 mm.

One male collected by L. S. B. Leakey at Athi River, Kenya. No date. Wing 421 mm. (New locality record.)

One female collected by E. H. Ward at Kinangop, Kenya, on 3/6/38. Wing 440 mm.

One female collected by H. Maingot at Nairobi, Kenya, in December, 1940. Wing 441 mm.

One female collected by T. W. Chorley at Kigezi, Uganda, on 14/7/40. Wing 410 mm. (Melanistic form.)

One female collected by G. H. Hopkins at Limuru, Kenya, on 4/1/37. Wing 408 mm. (Melanistic form.)

One female collected by L. S. B. Leakey at Limuru, Kenya, on 28/6/41. Wing 462 mm.

One female collected at Debra Marcos, Abyssinia, by A. Buchanan. Wing 428 mm.

One unsexed specimen. No data. Wing 398 mm.

One unsexed specimen collected by "Ishmael" at Kikuyu, Kenya, in September, 1936. Wing 388 mm. (New locality record.)

One unsexed specimen collected at Elburgon, on 2/12/36. No other data. Wing 423 mm. (New locality record.)

One unsexed specimen collected by A. M. Champion at Elgon, Kenya. No date. Wing 408 mm.

One unsexed specimen collected by W. MacClennan Wilson at Kiambu, Kenya, on 26/5/15. Wing 458 mm. (New locality record.)

One unsexed specimen collected at Kiambu, Kenya, on 2/3/16. No other data. Wing 463 mm.

One unsexed specimen collected by G. H. Hopkins at Lake Bunyoni, Uganda, on 24/12/39. Wing 405 mm. (New locality record.)

One unsexed specimen collected by G. Bush at Naivasha, Kenya, on 17/7/15. Wing 393 mm.

Two unsexed specimens. No data. Wings 388 mm. and 414 mm.

One unsexed specimen, apparently a juvenile (melanistic form) collected by Major Carnegie at Lumbwa, Kenya, on 9/11/15. Wing 415 mm. (New locality record.)

One unsexed specimen, apparently a juvenile (melanistic form) collected by G. Bush at Naivasha, on 17/7/15. Wing 403 mm.

Note.—These last two specimens are not quite like the melanistic form of Augur Buzzard and may turn out to be something as yet unrecognised.

(51) *Buteo rufofuscus archeri* Sclater.

Archer's Buzzard. .... One specimen.

One male collected by G. MacArthur at Kinangop, Kenya, in February, 1940. Wing 385 mm.

Note.—This appears to be the first record of this bird in Kenya and the identification is provisional, as no adequate account of this buzzard is available in the Museum.

(52) *Buteo oreophilus* Hart. and Neum.

Mountain Buzzard. .... Six specimens.

One female (mounted) collected by L. S. .B Leakey at Kijabe, (Magina, 7,500 feet), Kenya, in September, 1941. This bird had a ripe egg in the ovary. Three other pairs seen within a radius of four miles. (New locality record.)

One male collected by Sir Charles Belcher on the Kinangop, Kenya, (8,500 feet), on 1/10/40. Wing 345 mm. (New locality record.)

Two females collected by G. MacArthur on the Kinangop, Kenya, in February, 1940. Wings 354 mm. and 334 mm.

Two unsexed specimens collected on the Kinangop, Kenya, by Dr. C. J. Wilson, in September, 1941. Wings 322 mm. and 334 mm.

GENUS *Accipiter*.

(53) *Accipiter nisus nisus* (Linn.).

European Sparrow-hawk. .... One specimen.

One female ? collected by E. H. Ward at Kinangop, Kenya, on 4/12/28. Wing 233 mm. (The specimen is labelled female ? but it is highly likely that it is an immature male.) Apart from a single specimen seen, but not collected, by Sir Frederick Jackson, this is the first record of this species in East Africa. (New locality record.*)

(54) *Accipiter minullus tropicalis* Reichenow.

Little Sparrow-hawk. .... Three specimens.

One specimen (mounted). No data.

One male collected by H. J. Allen Turner at M'koi, Kenya, on 4/5/16. Wing 140 mm.

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* There may be some unrecorded specimens in private collections.

One unsexed juvenile collected by D. O. Roberts at Ruiru, Kenya, on 2/11/14. Wing 138 mm. (New locality record.)

(55) *Accipiter minullus intermedius* Erlanger.
Abyssinian Little Sparrow-hawk. .... No specimen.

(56) *Accipiter ovampensis* Gurney.
Ovampo Sparrow-hawk. .... Two specimens.
One male collected by R. Meinertzhagen at Nairobi on 1/3/16. Wing 225 mm.
One female collected by A. Loveridge at Morogoro, Tanganyika, on 23/11/18. Wing 220 mm.

(57) *Accipiter rufiventris rufiventris* A. Smith.
Rufous-breasted Sparrow-hawk. .... One specimen.
One male collected by Master Roberts on the Kinangop, Kenya, on 14/12/40. Wing 195 mm. (New locality record.)
Note.—This bird has a smaller wing measurement than those recorded in the books available, but it appears to be of this species.

(58) *Accipiter melanoleucus melanoleucus* A. Smith.
Black Sparrow-hawk. .... Five specimens.
One male collected by Sir Charles Belcher on the Kinangop, Kenya, on 11/10/40. Wing 290 mm. (New locality record.)
One male collected by H. G. Hopkins at Toro, Uganda, on 24/3/40. Wing 283 mm. (New locality record.)
One male collected by H. J. Allen Turner at Yala River, Kenya, on 3/11/13. Wing 287 mm. (New locality record.)
One unsexed specimen. No data. Wing 280 mm.
One male in immature plumage collected by H. G. Hopkins on Aberdare Range, Kinangop, Kenya, on 11/5/38. Wing 288 mm.

(59) *Accipiter* (sp. indet.). .... Two specimens.
One male collected by G. H. E. Hopkins at Lake Bunyoni, Kigezi, Uganda, on 1/1/40. Wing 330 mm. Tail 282 mm. Total length about 572 mm.
One male collected by N. Subuga at Bukara, Kigezi, Uganda, on 18/7/40. Wing 330 mm. Tail 284 mm. Total length about 590 mm.

Note.—If these birds are really males they are much too large for immature *Accipiter melanoleucus* which they resemble superficially. Even if they are wrongly sexed and are females they still do not seem to be the latter species. The wing-length and also the total length are comparable with that of a female *A. melanoleucus;* but the tails are too long and the colouring is wrong.

It was at first thought that these birds represented the young of a western species of the genus *Urotriorchis;* but this view cannot be upheld if, as Bannerman says, even in the immature, the tail is always considerably longer than the wing. For the present, these birds must be regarded as a larger undetermined *Accipiter*.

GENUS *Astur*.

(60) *Astur badius sphenurus* (Rüppell).

Eritrean Shikra. .... Six specimens.

One male collected by A. Loveridge at Morogoro, Tanganyika, on 20/8/17. Wing 177 mm. (*Note.*—Much less red-brown than Kenya specimens.)

One male collected by A. M. Champion at Lodwar, Kenya, on 14/8/35. Wing 172 mm. (New locality record.)

One female collected by D. G. MacInnes at Lodwar, Kenya, on 10/4/34. Wing 197 mm.

One female collected by A. Loveridge at Dar es Salaam, Tanganyika, on 2/7/18. Wing 179 mm. (*Note.*—Much less red-brown than Kenya specimens.)

Two unsexed and apparently juvenile specimens collected by C. G. Ishmael at Kampala, Uganda, on 17/10/36 and 19/11/36. Wings 170 mm. and 168 mm. (New locality record.)

(61) *Astur tachiro tachiro* (Daud.).

South African Goshawk. .... Two specimens.

One female (mounted) collected by R. B. Woosman at Nairobi, Kenya, in 1912.

One female collected by G. Moreau at Amani, Tanganyika, on 3/7/37. Wing 255 mm.

Note.—The identification of these two birds as *Astur tachiro tachiro* and not *Astur tachiro sparsimfasciatus* is based on the fact that these two specimens are much more rufous below than either of the local sub-species.

(62) *Astur tachiro sparsimfasciatus* Reichenow.

East African Goshawk. .... Six specimens.

Three juveniles (mounted), collected in the Karura Forest, near Nairobi, Kenya. No other data.

One female collected by L. S. B. Leakey at Nairobi, Kenya, in September, 1941. Wing 241 mm.

One male collected by R. C. van Someren at Ngong, Kenya, in August, 1940. Wing 200 mm. (New locality record.)

One juvenile, probably female. No data. Wing 232 mm.

(63) *Astur tachiro nyanzae* Neum.

Nyanza Goshawk. .... Three specimens.

One male collected by G. MacArthur, near Nairobi, Kenya, on April, 1939. Wing 215 mm.

One male collected by T. W. Chorley at Kigezi, Uganda, on 6/7/40. Wing 205 mm.

One juvenile collected by R. C. van Someren at Ngong, Kenya, on 3/3/40.

Note.—If this is a valid sub-species the characters which distinguish it from the sub-species *sparsimfasciatus* would appear to include the fact that these birds in adult plumage have a distinct white spot on the upper surface of the tail, as found in *A. tachiro tachiro* in South Africa and also reminiscent of that to be seen in the tail of *Accipiter ovampensis* but NOT affecting the quill as in that species. In juveniles the sub-species *nyanzae* differs from the sub-species *sparsimfasciatus* in having no spots on the under tail coverts and lower abdomen, both of which are white. Many authorities do not accept this as a valid sub-species; but merely as an example of individual variation. Much more material is needed to decide this point; but I am inclined to support the validity of the sub-species on the evidence before me.

GENUS *Melierax*.

(64) *Melierax metabates metabates* Heuglin.

White Nile Chanting Goshawk. ...... Seven specimens.

One male collected by T. W. Chorley at Pagule Chua, Uganda, on 3/1/37. Wing 320 mm. (New locality record.)

One male and one female (a pair) collected by Museum collector at Kendu Bay, Kenya, on 25/12/41. Wings 310 mm. and 319 mm. (New locality record.)

One female collected by L. S. B. Leakey at Oyugi's, Kendu, Kenya, on 12/2/35. Wing 336 mm. (New locality record.)

One male and one female collected by G. H. Hopkins at Laropi, West, Madi, Uganda, on 5/3/37. Wings 318 mm. and 336 mm. (New locality record.)

One specimen. No data. Wing 295 mm.

(65) *Melierax poliopterus* Cabanis.

East African Chanting Goshawk. ... Seven specimens.

One male (mounted) collected by L. S. B. Leakey at Mwala, Ukamba, Kenya, on 17-5-41. (New locality record.)

One female (mounted) collected by L. S. B. Leakey at Mua, near Machakos, Kenya, on 30/5/41.

One male collected by L. S. B. Leakey at Mua, near Machakos, Kenya, on 16/5/41. Wing 298 mm.

One female collected by A. M. Champion at Mui, Kitui, Kenya, on 4/1/38. Wing 320 mm. (New locality record.)

One specimen, unsexed, collected by J. H. Phipps. No other data. Wing 316 mm.

Two specimens collected by H. J. Allen Turner at Manda Island, Kenya, on 27/4/16. Not sexed. Wings 300 mm. and 312 mm. (New locality record.)

(66) *Melierax gabar* (Daudin).
Gabar Goshawk. .... Thirteen specimens.

Note.—In Jackson's account it is stated that "the under tail coverts are unbarred." In a proportion of the specimens described below the under tail coverts ARE barred, but not very heavily. It is possible that these represent a valid subspecies. Specimens which have barring on the under tail coverts are marked "(t.c.b.)."

One unsexed juvenile (mounted) collected at Nairobi. No data. (t.c.b.)

One male (mounted) collected by Museum collector at Ukambani, Kenya.

One male collected at Morogoro, Tanganyika, by A. Loveridge, on 23/11/18. Wing 179 mm.

One male collected by M. P. Seth-Smith on 23/8/13, at Ruiru, Kenya. Wing 177 mm. (t.c.b.) (New locality record.)

One male collected by A. M. Champion at Lodwar, Kenya, on 22/2/33. Wing 170 mm. (t.c.b.)

One male collected by D. G. MacInnes at Komagin River, Kenya, on 7/3/34. Wing 170 mm. (t.c.b.) (New locality record.)

One male collected by D. G. MacInnes at Gendia, Kendu Bay, Kenya, on 1/5/32. Wing 169 mm. (New locality record.)

One female collected by L. S. B. Leakey at Gendia, Kendu Bay, Kenya, on 1/5/32. Wing 193 mm.

One female collected by D. G. MacInnes at Lopi River, Kenya, on 18/2/34. Wing 190 mm. (t.c.b.) (New locality record.)

One female from Mui, Kitui, Kenya, collected by A. M. Champion on 1/1/38. Wing 189 mm. (t.c.b.) (New locality record.)

One male juvenile collected by A. M. Champion at Kapenguria, Kenya, on 14/8/34. Wing 170 mm. (New locality record.)

One male juvenile collected by A. M. Champion at Chambezi, Northern Rhodesia, on 12/6/34. Wing 153 mm.

One male (melanistic form) collected by A. F. Francklin at Ruiru, Kenya, on 9/11/13. Wing 170 mm.

Note.—The juvenile from Chambezi is unusually small.

GENUS *Circus*.

(67) *Circus pyargus* (Linn.).

Montagu's Harrier. .... One specimen.

One female collected by H. G. Hopkins at Masaka, Uganda, on 21/12/37. Wing 368 mm. (New locality record.)

(68) *Circus macrourus* (S. G. Gmelin).

Pallid Harrier. .... Seven specimens.

One male (mounted) collected by A. J. Wiley at Ruiru, Kenya, in December, 1941. (New locality record.)

One female (mounted) collected by L. S. B. Leakey at Naivasha, in March, 1941.

One female. No data. Wing 360 mm.

One female. No data. Wing 358 mm.

One juvenile male (brown plumage) collected by A. Loveridge at West Kenia, Kenya, on 23/11/15. Wing 330 mm. (New locality record.)

One juvenile female collected by L. S. B. Leakey at Embu, Kenya, on 25/1/41. Wing 340 mm. (New locality record.)

One juvenile female collected by L. S. B. Leakey at Kanjera, Kendu Bay, Kenya, on 16/3/32. Wing 340 mm. (New locality record.)

(69) *Circus aeruginosus aeruginosus* (Linn.).

European Marsh Harrier. .... Two specimens.

One male (mounted) collected by L. S. B. Leakey at Kanjera, Kendu Bay, Kenya, in January, 1935. (New locality record.)

One female (mounted) collected by D. G. MacInnes at Limuru, Kenya, in February, 1941. (*Note.*—Both have the heads creamy white as is typical in immature birds.) (New locality record.)

(70) *Circus aeruginosus aequatorialis* Stresemann.

Central African Marsh Harrier. .... Two specimens.

One male (mounted) collected by L. S. B. Leakey, near Fort Hall, Kenya, in July, 1941. (New locality record.)

One female collected by Sir Charles Belcher on the Kinangop, in July, 1941. (New locality record.)

(71) *Circus maurus* (Temminck).

South African Black Harrier. .... Two specimens.

One male collected by T. W. Chorley at Mbuya, Uganda, on 30/3/37. Wing 332 mm.

One unsexed specimen collected by G. H. Hopkins at Masaka, Uganda, on 21/12/37. Wing 340 mm.

Note.—These appear to be the first records of the South African black harrier from East Africa, and are, therefore, of

special interest. These Uganda birds are not quite identical with the description given in Shelly and Sclater, Vol. 3, but they stand nearer to *Circus maurus* than to any other harrier. They will probably prove to be a local East African sub-species.

GENUS *Gymnogenys*.

(72) *Gymnogenys typicus typicus* (A. Smith).

Banded Gymnogene
or Bare-faced Hawk. .... Seven specimens.

One male (mounted). No data.

One female collected by Museum collector at Chyulu Hills, Kenya, on 12/7/38. Wing 460 mm.

One unsexed specimen collected by A. Black at Ruaraka, Kenya, on 1/6/36. Wing 430 mm. (New locality record.)

One specimen without data. Wing 468 mm.

One juvenile female collected by Miss C. E. Bennet, Kabete, Kenya, on 17/8/39. Wing 432 mm. (New locality record.)

Two juvenile specimens collected at Equator Farm, Kenya, in July, 1925. No other data. Wings 454 mm. and 438 mm. (New locality record.)

GENUS *Pandion*.

(73) *Pandion haliaëtus haliaëtus* (Linn.).

Osprey. .... One specimen.

Specimen (mounted) collected by L. S. B. Leakey in 1935, at Kanjera, Kendu Bay, Kenya.

CORRIGENDUM.

On page 200 of Volume 16, the family name *LYMANTRIIDAE* should appear above the species *Psalis pennatula* F. *Chilena donaldsoni* Holl. belongs to the previous family *LASIOCAMPIDAE.*

OCCASIONAL NOTES.

NOTES FROM THE PERSIAN COAST. It was a pleasant surprise amid the barren surroundings of coastal Persia, to discover that the riverine strip along the Shat-al-Arab gives permanent shelter to a small population of black partridge. For a depth of perhaps half a mile along the river bank the Arab-Persian population cultivates its date-palms and during the temperate winter months the gardens, formed into plots by a random pattern of irrigation ditches are filled with small food crops. Patches of lucerne survive, of course, all the year round and the coarser vegetation defies a sun radiation of 175°. It is here that the black partridge hides during the heat of summer, close to the tidal (fresh water) ditches. Spring comes early after the brief, severe winter spell and I found a hen sitting on her eggs in lucerne in late February. In March, chicks were observed in the marsh areas around Dorkwain about fifteen miles inland, where I saw greylag geese, estimated from a rough count at 500, on one of the larger "meres." With them the mallard and wigeon, the teal and redshank, plover and snipe patterned the sky in their evening flights. Another migrant, who with customary fearlessness became a constant companion in our mess garden, was the robin. His visits, regular because encouraged, frequently met with expostulations from our pet goose, who resented any diversion of attention from herself.

Commander Granville Roberts, R.N.V.R.,
Mombasa.

FIELD NOTES ON SECRETARY BIRD. Nest at Molo used in April, 1941, in *gambura* tree, 15 feet up, on top of tree. Took the *only* egg; there were four potatoes in the nest with the egg, three pecked-at and one untouched. Potatoes were definitely from Kikuyu *shambas,* half a mile distant. Not known whether birds actually sat on potatoes after egg was taken, probably not.

There was a dead (yellow ?) mongoose in centre of nest, believed to have been killed in nest whilst trying to steal egg, the neck and back torn open.

Henley,
Prince of Wales' School.

EELS AND TROUT. As is generally known all rivers which debouch into the Indian Ocean contain eels; the most common being the variegated eel *Anguilla mosambica.* These eels grow to a weight of 24 lbs. and during the past five years they have penetrated further into the regions containing the big trout. It is believed that temperature is the controlling factor as physical features, such as waterfalls, present no difficulty to the upward migration of an eel. For instance, there are many eels in the Chania River, above the Thika Falls.

It is also believed, although no actual data over a sufficient span of years can be produced, that the Gura, Nyeri Chania, Sagana, and Amboni Rivers are getting warmer. Anyway there are eels now in stretches of the Gura River where seven years ago they certainly were not. These big eels feed on big trout, and as a result of this gradual invasion the number of big trout, in the Gura has got less and less.

Many persons have cast doubt on this fact, as they have never seen any eels. The reason for this is that the eel does its deadly work during the hours of darkness. Other people have wondered how a large trout can be caught and killed by an eel. Recently, the officers of the Game Department have gained much knowledge on this subject. A trout, running say from 3 lbs. to 6 lbs. in weight, is lying in position behind a large rock or in a deep pool. The eel comes nosing along and runs its nose against the flank of the trout without the latter taking the slightest notice. The eel then nips the trout in the soft flesh of the belly just in front of the ventral fin. Away goes the fish with a rush and takes refuge behind another rock or in another part of the pool.

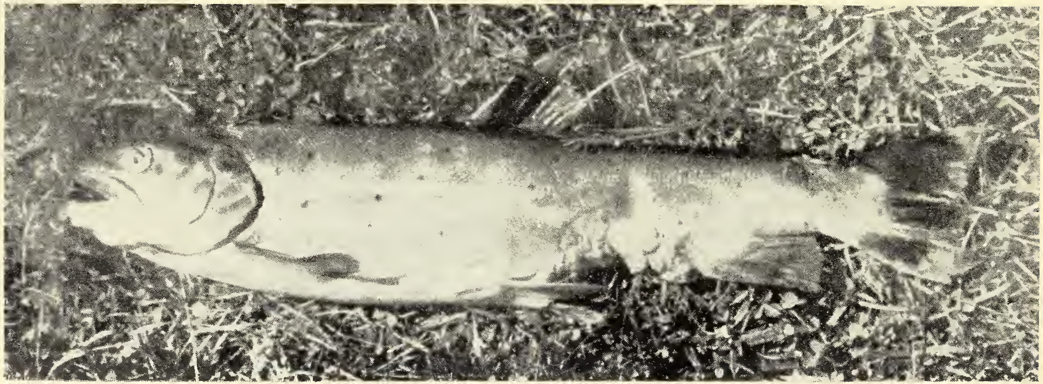
The eel comes questing up and within ten or fifteen minutes does exactly the same again. Away rushes the fish and the procedure is continued until the trout is completely exhausted when the eel makes a meal from the belly. The time taken was, in one example, just under an hour and a half.

The photograph, Plate 21, shows a beautiful hen brown trout of 3¾ lbs. from the Gura. This trout had been killed by an eel. Within a very short time, the eel was located, caught and weighed 9½ lbs.

There is no doubt, but that this upward invasion of some of our rivers has had a very serious effect on the big trout of the lower waters.

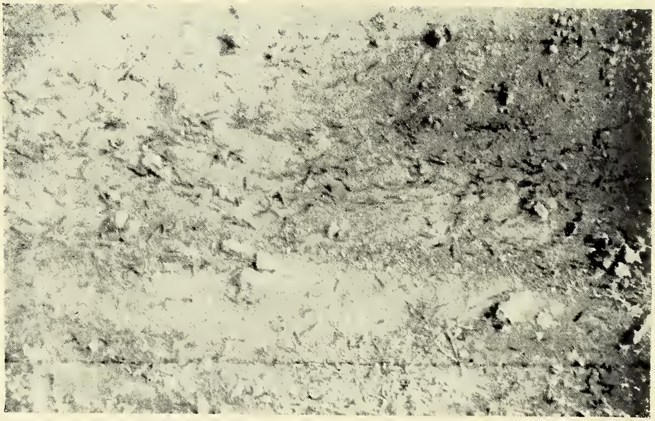
HUGH COPLEY.

PLATE 21.

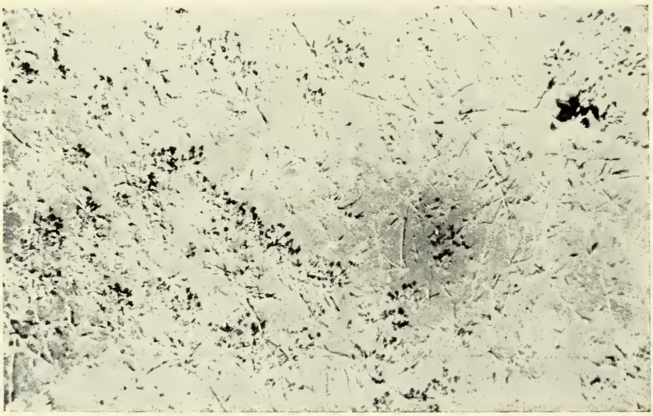


Hen brown trout killed by an eel.

PLATE 22.



Army-worm on the move.



After the army has passed, untouched clover plants and rhizomes of Kikuyu grass are left.

Kites enjoying the army-worm.

SOME NOTES ON THE ARMY-WORM INVASION OF THE NAIROBI DISTRICT IN MARCH, 1940. Before giving a brief account of the army-worm invasion and its effects on pasture in the Nairobi district, it is perhaps worth recording that some of the older European inhabitants of Kenya hold that there is a connexion between the migration of pierine butterflies of the genus *Glycestha* and army-worm infestation. Actually this recent infestation was foretold to me by a Kabete resident following the extensive easterly migration of *Glycestha* [mostly *G. aurota* (Fab.)] which occurred between July 16th and 30th, 1939, and covered, to my knowledge, the area between Ndeya and the outskirts of Nairobi. It will be interesting to observe if future migrations of the white butterflies are followed by plagues of larvae of the noctuid moths.

It is, of course, possible that factors causing the butterfly migration may also lead to the migration of the moths; but if the moths migrated to the Nairobi district in July, 1939, it is probable that a small undetected brood of larvae developed during the short rains of that year and that the larvae of the 1940 invasion developed from eggs laid by this earlier brood.

In March, 1940, at Kabete, the grass-rains began with a fall of about 1¼ inches during the night of February 27th, and this was followed by a little over ½ inch on the following night. This amount of rain was sufficient to produce a green cover over the Laboratory paddocks which, previously, had been grazed almost bare. On March 2nd, there was a shower during the afternoon and on the 12th, army-worm were first noticed in the golf-course paddock. (On March 14th, army-worm were found in the gardens along Sclater's Road between the Showground and Westland's railway crossing.) The larvae were noted in the one-acre paddock adjoining my garden on the 15th, and three days later, they entered the garden.

By March 20th and 21st, hardly a blade of grass was left in the Laboratory paddocks except in the shade of trees. The larvae appeared to avoid all patches of dense shade and ceased feeding and travelling at dusk. The paddocks and lawns were now a depressing sight and it became necessary to revert to the supplementary feeding of the cattle.

Meanwhile five larvae had been collected in order to breed moths for examination. On March 22nd, these larvae began to pupate and at the same time the larvae in the paddocks began to "go down." By the 26th, hardly any larvae could be found in the fields. Only two months (*Laphygma exempta* Walk.) emerged from the five pupae kept under observation and they appeared on April 11th and 12th. Thus the pupal period was about twenty-one days.

The difficulty of controlling these pests was demonstrated by the experience of Mr. D. C. Edwards, Senior Agricultural

Officer, in attempting to prevent the army from advancing into his experimental plots. Whilst it was possible to stop the advance of the larvae across the bare strip of about three yards width surrounding the plots, it transpired that eggs had been deposited actually in the plots themselves and the control of the larvae hatched from these, presented a much more difficult problem.

Observations in the paddocks and garden showed that the larvae ate all species of *Gramineae* and *Cyperaceae* that they encountered. Even the coarse blades of *Pennisetum purpureum* Schum. were attacked. No damage was observed to plants of other orders except that garden montbretia, *Tritonia crocosmiflora,* N.O. *Iridaceae*) leaves were partly eaten.

This selective feeding had a marked effect on the Laboratory paddocks. The Laboratory is situated at the lower limit of the Kikuyu grass country and careful management of the grazing is necessary to preserve over most of the area the Kikuyu grass-clover (*Pennisetum clandestinum—Trifolium johnstoni*) associes. Insufficient grazing leads to the suppression of the clover, a species which is easily choked out if the grass becomes long, and loss of clover leads to a fall in fertility when coarse undesirable grasses tend to replace the Kikuyu grass.

It will be recalled that the army-worm made their appearance shortly after the first rain when the grass was about 2 to 3 inches high. Owing to various factors one hillside in particular had many seedlings of ruderal grasses (e.g., *Eragrostis tenuifolia* Hochst., *Harpacne schimperi* Hochst., *Aristida adoensis* Hochst.). The army-worm consumed practically all the grasses growing on this hillside; but left the clover. The further rain which fell after the army-worm invasion caused the clover to push ahead. Rhizomatous grasses, such as Kikuyu grass also came away rapidly; but the majority of the other grasses were completely destroyed. A few derived from seeds late in germinating appeared later in the season in the barer spots. The invasion was, therefore, on the whole beneficial to the pastures.

In areas to the east of Nairobi, where the *Acacia*-tall grass savannah formation holds, the results of the invasion were, of course, entirely different. The main associes of grasses on the Athi Plains is *Themeda triandra—Pennisetum masaicum.* The later rain did little to restore the growth of edible grasses and over much of the land *Senecio discifolius* Oliv., *Conyza* spp. and other composite weeds, which were not destroyed by the larvae, formed most of the low vegetation for several months.

At Kabete, many hundreds of larvae were destroyed by kites (*Milvus migrans parasitus*) a dozen or more often being seen strung out in a line along the advancing stream of army-worm.

Other factors, however, must have helped in controlling the pests for, although at the time that the caged pupae gave

rise to imagines, there was ample fresh grass available, no further trouble was experienced. The fact that two moths were obtained so quickly from five larvae suggested that a further outbreak might occur and that we should be short of grazing until the short rains. We were, therefore, greatly relieved when no fresh brood of larvae appeared.

J. R. HUDSON,
Veterinary Research Laboratory, Kabete.

NOTE ON GADWALL. During December, 1942, and January, 1943, three more specimens of gadwall (*Anas strepera*) have been received at the Coryndon Memorial Museum, Nairobi. All three were shot near Lake Nakuru. It would seem, therefore, that this duck is not altogether a rare visitor to Kenya. (See note on gadwall in this *Journal*, **16**, 223.)

L. S. B. LEAKEY.

CORYNDON MUSEUM.

Report for the Half-year January 1st to June 30th, 1942.

By the Honorary Curator.

During the first half of the year, satisfactory progress can be reported in all branches of the Museum's activities.

The policy of adding new exhibits to the main hall and galleries at frequent intervals was continued and the public showed its appreciation of this policy by increased attendance.

Among the more important of the many new or wholly reorganised exhibits placed on view during the period under review the following deserve special mention:—

(*a*) The ethnological collection was completely rearranged and relabeled and it was also considerably added to. It is now set out according to tribal groups to illustrate the more important variations of tribal material culture.

(*b*) The bird exhibit was again considerably increased and new descriptive labels giving the scientific as well as the common names were made.

(*c*) The fish exhibit had many new specimens added to it.

(*d*) New exhibits were prepared showing marine, freshwater and land shells.

(*e*) A special exhibit of local dye plants and samples of wool dyed by means of them proved to be a great attraction at the conversazione in 1941, and it was, therefore, augmented and placed on permanent view.

(*f*) A mounted skeleton of a gorilla was prepared and placed on view.

(*g*) A special exhibit of economic non-metallic minerals was arranged by the geological department.

Research was carried out despite the handicaps imposed by war conditions and scientific papers were prepared on a number of subjects and most of the results either have, or shortly will be, published in the Journal of the East African Natural History Society.

Three new series of lectures were inaugurated, one for adults and two for school children and have been well-attended.

A very successful collecting expedition to the Kibwezi district was organised and carried out with the collaboration of the Game Department.

Accessions for the period were very satisfactory and will be mentioned in more detail at the end of the year.

The number of visitors during the first six months of the year was 7,089 in addition to about two hundred members and hundreds of school children.

L. S. B. Leakey.

CONVERSAZIONE.

The annual conversazione, sponsored by the Museum Board of Trustees and the Natural History Society, was held in the Coryndon Museum on Friday evening, Saturday and Sunday the 23rd, 24th and 25th of October respectively. Friday evening was devoted to members, their friends and their guests; Saturday morning was set on one side for the schools whilst during Saturday afternoon, evening and all day Sunday the exhibition was open to the general public.

The number of persons visiting the Museum during this period was greatly in excess of the attendance last year for 571 persons paid for admittance whilst 405 school children were conducted round the exhibits. During the conversazione a guessing competition was held and this yielded a sum of Shs. 63/- which was donated to the Red Cross.

The following is a brief account of the various exhibits displayed. Paper shortage does not admit of as full a description as we would wish.

Botanical Exhibits.

(a) *Indigenous drug plants and their significance in Medicine.*—The exhibit was intended to draw attention to the possibilities of drugs derived from the indigenous plants of East Africa.

It was shown how native arrow-poisons yield valuable drugs for the treatment of heart disease; how fish-poisons are of great economic significance owing to their insecticidal properties; attention was drawn also to the many febrifuges used by the native and to the importance which they might assume if a shortage of quinine occurred. Other native remedies, used for the treatment of dysentery, bilharziosis, intestinal worms, etc., were on view.

A table enumerated some of the active principles which can be obtained from the plants on exhibition, such as:

Conessine	Esters of salicylic acid	Rotenone
d-nor-iso-ephedrine	Hyoscyamine	Tephrosine
Erythrophloeine	Lobelin	Scopolamine
Embelin	Ouabain	Somalin

(b) Another exhibit consisted of twenty-three brilliantly-executed paintings of wild flowers from Marsabit, Isiolo, and from various localities in Tanganyika, by Mrs. Joy Bally. These paintings are now permanently on view in the botanical room at the Coryndon Memorial Museum.

(c) A living specimen of the giant among East African succulents, *Adenia globosa* (N.O. *Passifloraceae*) was also on view.

Medical Department.

This department put up a most instructive and attractive display principally dealing with yellow fever. Large models of the eggs, pupa, larvae and the adults of *Aëdes aegypti* and *Aëdes simpsoni* (which carry yellow fever) gave one a very good idea of what these enemies of mankind look like. Models showing the development of *Anopheles gambiae* (the carrier of malaria) and of *Culex fatigans*, (which carries elephantiasis) were also on view. It is interesting to note that these excellent models were made by a Wakamba wood carver. The breeding places chosen by these mosquitoes were illustrated by the aid of photographs and the places from which yellow fever had been reported were shown by the aid of large maps. The outfit for giving inoculations against yellow fever was also on view.

Photographs.

Just close to this exhibit was a beautiful display of photographs taken by A. H. Firmin on a recent trip up Mount Kilimanjaro. For sheer artistic merit many of these pictures would be hard to beat and the exhibit was greatly appreciated by the visitors.

Exhibits by Museum Staff.

(*a*) *Fossils.*—An exhibit of Miocene fossils was staged showing a nearly complete skull of *Brachyodus* c.f. *africanus:* a jaw of *Macrotherium:* a fossil tortoise; fossil rodents; molluscs and, as a centrepiece, a jaw of a Miocene anthropoid ape discovered in September, 1942. This jaw will be the subject of a special paper in the Journal in the near future.

An exhibit of fossil fish from Pleistocene deposits from the Lake Victoria basin was also staged. These fish belong to the Athi River System and have quite disappeared from the Lake Victoria basin showing that in recent geological times Lake Victoria has dried up.

(*b*) *Historical Exhibit.*—A small historical exhibit was staged illustrating the early history of East Africa. Outstanding were exhibits of early maps, the original dairy of John Pigott's journey to the Tana in 1889, and a series of photographs of Mombasa in the days prior to 1900.

(*c*) *Birds' Nests.*—An exhibit illustrative of some of the main types of the nests of Kenya birds was staged and proved a great attraction. This exhibit will shortly be placed on permanent view in the Museum.

(*d*) *Migration of Birds.*—An exhibit illustrating the migratory birds which are common to the British Isles and Kenya was staged. Among the birds shown were a European sparrow-hawk and a European gadwall which, although there have been one or two reports of these birds having been seen, are believed to be the only specimens of these species actually collected in Kenya.

Veterinary Department.

This departmental exhibit illustrated the importance of ticks as vectors of disease.

One case was devoted to east coast fever. The life history of the tick was illustrated by drawings and specimens of the adult, larval and nymphal forms, whilst the other half of the case contained diagrams of the stages in the life-cycle of the protozoal parasite. The contents of two other frames described tick typhus and the cycle of the tick fever parasite of dogs.

Scott Agricultural Laboratory.

The chemical section of the Scott Agricultural Laboratories has been investigating local fibres, endeavouring to find fibres suitable for the manufacture of fishing nets and suitable for brooms and brushes. The exhibit consisted of a few of the most interesting fibres. A set of fibres derived from *Sanseviera* spp. was shown demonstrating the enormous variation in the thickness of these fibres. Another exhibit consisted of fibres derived from the genus *Musa*, varying from coarse manilla hemp to the very fine fibre of *Musa ensete*, which it is hoped will be suitable for the manufacture of fishing nets for use in Lake Victoria. Another exhibit consisted of sisal twines of varying thickness, the coarsest being the machine-made binder-twine and the finest a twine spun from immature sisal fibre that was shown made into a net. This latter twine is the finest sisal twine ever produced. There was also an exhibit of the coarse fibre obtainable from the doum palm, together with brushes and brooms made from it.

Mining and Geological Department.

The exhibit by the Mining and Geological Department consisted of a display of local minerals which have recently been investigated by the Department either for immediate war purposes or in connection with the establishment of local industries. The minerals included in this display were galena (lead ore) and barytes, manganese ores, pyrites, arsenical pyrites, kyanite, talc, magnesite, graphite, mica, and asbestos.

Mercury ore (cinnabar) from a locality in the Coast Province was exhibited for the first time.

In the centre of the exhibit was a large specimen of the massive sulphide ore from Macalder Mines, Ltd., in South Kavirondo. This ore is highly complex and contains gold, silver, copper, lead, zinc, arsenic, and cobalt.

Spinning Exhibit.

This was staged where the lion usually stands. Various ladies demonstrated hand-spinning to most attentive audiences. On a stand at the back examples of wools dyed with local dyes and various garments such as sea-boot stockings, jumpers in various colours and other useful garments made from wool grown and spun in Kenya were displayed.

The Trustees and Society are greatly indebted to Mrs. Gregory Smith, Mrs. Alan, and other lady helpers for this most instructive show.

Corals.

This year the exhibits overflowed to the balcony, and the first exhibit was a most outstanding display of East African corals which had been collected by Miss J. Moore and Captain A. T. A. Ritchie. Until these corals have been studied by experts the number of species contained in the exhibit will not be known, but it is doubtful if, among the eighty-three specimens, there were more than three duplicates. It is hoped that one day the best specimens will be properly displayed in the Museum.

Industrial Research and Development Board.

This attractive exhibit had a background of treated skins of game animals each skin being labelled with the method of preparation. The two skins which caused the most interest were sheep skins tanned with their wool on. Samples of various types of leather were also on view. On a long table were exhibits of malt prepared from barley grown in the Colony, a selection of local oils and some locally-produced pigments. The oils included a sample of shark-liver oil, rich in vitamin A. Three types of castor oil, medicinal, dehydrated, and technical were displayed. Hydraulic-brake fluid was also on show. The samples of rubber latex were most interesting as were the range of distempers, and other pigments now being developed in Kenya.

Drawing and other types of paper demonstrated the possibilities of another local industry and further new developments were shown. The stall was of great interest to visitors and public.

(The invitation cards sent to guests were on hand-made paper from the Industrial Research and Development Board's laboratory.)

Game Department Stall.

This exhibit endeavoured to instruct the public in the biological fact that trout vary their colour according to their environment. Models of trout, from different waters, different water-temperatures and different altitudes were shown to prove this fact. Against this there was also a model of a blue trout from the Nyeri Chania River the colour of which was due to an upset in pigmentation. Samples of *Tilapia variabilis*

which illustrated the colour range of this most variable fish were shown. An interesting exhibit was a model of the rainbow-brown trout hybrid from the Nyeri Chania River. All these most beautiful models made from Kenya plaster were the work of Mr. Alan Turner.

EXOTIC AQUARIUM FISHES.

This exhibit, the result of the joint effort of Majors Cade and Imbert, was the admiration of all visitors and the envy of the schoolboys.

Beautiful specimens of swordtails *Xiphophorus helleri: Platypoecius maculatus* ranging from black to glorious red; and of Danios, *Brachydonio rerio* were shown. A fine pair of *Panchax playfairii;* a pair of armoured cat-fish from South America; *Corydoras* sp. were also displayed whilst all the usual mosquito-eating fish *Heterandria, Lebistes,* and *Gambusia* gave delight to the eye. A golden strain of *Lebistes* was also a great attraction.

Through the help of Mrs. H. Copley and Mr. Galt of the Forestry Department, the main hall, staircase, and balcony were decorated tastefully with palms, ferns, and pot flowers. Last but not least the thanks of the Society must be given to the band of attendants who conducted and explained the exhibits to the visitors. Without their aid the exhibits would have been very dull.

Our first Conversazione was voted a success; this second one seems to have surpassed it. With the experience that we have gained, we hope to do even better next year.

H.C.

FINANCIAL STATEMENT OF THE SECOND ANNUAL CONVERSAZIONE,

OCTOBER 23RD, 24TH, AND 25TH, 1942.

	Shs. cts.		Shs. cts.
Takings at the Door ...	286 30	Postages	10 00
		Hire of Chairs, etc. ...	87 60
		Advertisements—	
		E.A. Standard ...	36 00
		Sunday Post ...	12 00
			145 60
		Balance	140 70
Total ...	286 30	Total ...	286 30

It has been decided that the balance shown in the above account shall be devoted to the purchase of new books for the Library of the Society.

EAST AFRICA NATURAL HISTORY SOCIETY.

LIST OF HONORARY MEMBERS.

H.E. THE GOVERNOR OF KENYA.
H.E. THE GOVERNOR OF UGANDA.

LIST OF LIFE MEMBERS.

Name.	Address.
Banks, F. G.	Entebbe.
Blain, Gilbert	9, Landsdown Place West, Bath, England.
Cane, Hudson	Limuru.
Dobbs, C. M.	Heathville, 8, Arlesbury Grove, Donnybrook, Dublin.
Gedye, A. F. J.	P.O. Box 216, Nairobi.
Harger, R. L.	c/o Medical Department, Kisumu.
Hobley, C. W.	Chale, Sidcup, England.
Loveridge, A.	Museum of Comparative Zoology at Harvard College, Cambridge, Massachusetts.
Leakey, Dr. L. S. B.	The Coryndon Museum, Nairobi.
McMillan, Lady	Chiromo, Nairobi.
Mitchell, H. G.	379, Upper Richmond Road, Putney, England.
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Patterson, Dr. A. R.	Medical Department, Nairobi.
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NOTES ON THE EAST AFRICAN MIOCENE PRIMATES.

By D. G. MacInnes, Ph.D.

Introduction.

The material to be described in this paper was obtained from Rusinga Island and Songhor, Kenya, during various scientific expeditions, primarily by members of Dr. L. S. B. Leakey's third and fourth E.A. Archaeological Expeditions, of 1932 and 1935 respectively. Additional material was obtained from Songhor by the author in 1938, and by Dr. Leakey in 1940 and 1942.

Papers dealing with the whole of the collections of mammalian fossils obtained by the earlier expeditions, were prepared for publication some years ago, but unfortunately many unforeseen circumstances have combined to delay publication. The major paper, dealing with the Proboscidea, (MacInnes, 1942), which was submitted for publication in 1937, only appeared in July, 1942, and it has now been decided that detailed descriptions of the remainder of the material should be placed on record without further delay. Owing to the lack of sufficient comparative material, and of much of the relevant literature, these papers must be confined largely to descriptive work, rather than comprehensive systematic discussion.

The present paper deals first—under the heading "Correlation"—with the evidence supplied by the fossil fauna of the area as a whole, in an attempt to determine the geological horizon to which the material subsequently described should be assigned. The remainder of the paper deals with the fossil Primates obtained during the expeditions referred to above. The study of some of the specimens recovered by the earlier expeditions was greatly facilitated by members of the Department of Anatomy at Cambridge University, and I should like particularly to express my thanks to Professor Harris and to Dr. Duckworth, who provided me with comparative material in this connection, and whose help and advice was much appreciated. My thanks are also due to Dr. A. T. Hopwood of the British Museum of Natural History, who enabled me to examine the types of certain fossil specimens, and to Mr. Sam Evans of Songhor, from whose farm much of this interesting material was obtained.

Dr. Leakey's most recent visit to Rusinga Island, in August, 1942, yielded additional anthropoid material, including a nearly complete mandible, and a left astragalus, which are assigned to *Proconsul africanus* Hopwood. I am indebted to Major Hopkirk of the S.R.M.C. for his help in attempting to obtain, by X-ray, the root-cavity formation of this mandible, and certain internal features of the structure of the astragalus. It had been hoped that examination of the trabeculae of the latter might give some indication of the main line of stress, and thus suggest the normal

attitude of the animal. Unfortunately, Major Hopkirk found that the cancellous bone was so heavily mineralized, that adequate contrast between the lamellae and the spaces was not obtainable.

Finally, I should like to take this opportunity of expressing my deep appreciation of Dr. Leakey's constant co-operation, and my thanks for his invaluable help in the preparation of this paper, and for placing at my disposal the material upon which so much of the paper is based.

Note on Terminology Used in This Paper.

Note.—The terminology of the cusps, used throughout this paper, follows H. F. Osborn, *Evolution of the Mammalian Molar Teeth*, 1907.

Upper Premolars:
Antero-internal=Deuterocone. Antero-external=Protocone.
Postero-internal=Tetartocone. Postero-external=Tritocone.

Upper Molars:
Antero-internal=Protocone. Antero-external=Paracone.
Postero-internal=Hypocone. Postero-external=Metacone.

Lower Premolars:
Antero-internal=Paraconid. Antero-external=Protoconid.
Meso-internal=Metaconid.
Postero-internal=Entoconid. Postero-external=Hypoconid.

Lower Molars:
Antero-internal=Metaconid. Antero-external=Protoconid.
Postero-internal=Entoconid. Postero-external=Hypoconid.
Postero-medial=Hypoconulid.

The explanation of the tooth measurements is as follows:—

Upper and Lower Incisors: Length=maximum antero-posterior length, at right angles to the line of the alveolus. Breadth=maximum breadth at right angles to the long axis of the root, and parallel to the line of the alveolus.

Upper and Lower Canines, and Lower Premolars: Length=maximum length (i.e., following the long axis of the roots). Breadth=maximum transverse breadth, at right angles to length measurement.

Upper Premolars, Upper and Lower Molars: Length=maximum antero-posterior length, parallel to the alveolar border. Breadth=maximum transverse breadth, approximately at right angles.

Text figures and plates are reproduced natural size throughout.

Correlation.

The material collected by the various scientific expeditions referred to in the introduction, was obtained from four principal localities in the Kavirondo section of the Victoria Nyanza basin. Of these localities, Rusinga Island proved to have the most extensive fossil beds, and yielded the largest variety of mammalian remains. The deposits of Karungu were previously known from Dr. Felix Oswald's work in 1911, and provided a relatively small variety of fossils. Songhor yielded a small but none the less important selection, whilst Kiboko Island, in some respects the

most important of them all, has provided a somewhat puzzling assortment of Mastodon remains and very little besides. The following table gives a list of the genera included in these collections, and the localities from which their remains have been recovered. It will be seen that some thirteen genera are recorded from Kiboko Island which is, in a sense, deceptive, since all but *Trilophodon* and *Climacoceras* are represented by little more than one fragment. The table serves, however, to give an indication as to the distribution of the fossils. The relative isolation of these various localities renders any stratigraphical correlation between them difficult,* but it will be seen from the table that there is no faunal evidence to suggest that any one of these localities represents an appreciably earlier or later geological period than the others.

	Rusinga.	Karungu.	Songhor.	Kiboko.
Deinotherium ...	×	×	—	×
Trilophodon * † ...	×	—	—	×
Rhinoceros † ...	×	×	—	×
Brachyodus * † ...	×	—	—	—
Ancodon ...	—	—	—	×
Hyaenodon ...	—	—	—	×
Amphicyon ...	×	—	—	—
Pterodon ...	×	—	—	×
Herpestes ...	×	—	—	—
Felis * † ...	×	—	—	×
Carnivora indet. ...	×	—	×	×
Macrotherium ...	×	—	—	—
Listriodon † ...	×	—	—	×
Suidae indet. † ...	×	—	—	×
Amphitragulus ...	×	—	×	—
Selenodonta indet. ...	×	—	×	—
Climacoceras ...	—	—	—	×
Pliohyrax † ...	×	—	—	—
Myohyrax * ...	×	—	—	—
Rodentia indet. ...	×	—	×	—
Palaeoerinaceus ...	×	—	—	—
Progalago ...	—	—	×	—
Mesopithecus ...	×	—	—	×
Limnopithecus ...	×	—	×	—
Xenopithecus ...	×	—	×	—
Proconsul ...	×	—	×	×

* This genus has previously been recorded from Karungu.
† This genus has previously been recorded from Losodok.

It has already been pointed out that the deposits of East Africa from which this collection of fossils was obtained, cannot yet be correlated on purely stratigraphical evidence with those of Europe or elsewhere. The study of the fossil fauna is, therefore, complicated by our uncertainty of the exact period to which

*Dr. P. R. Kent is understood to have prepared a paper on this question, which is already in the press.

they belong. A consideration of the existing fauna shows at once that many groups of animals, whose ranges formerly extended over the greater part of the world, are now confined almost solely to the African continent. For example, the remains of an elephant obtained anywhere in Europe, would indicate that the deposit from which they were procured was of Pleistocene age. Clearly, however, the same would not apply in Africa. It seems reasonable to suppose that the variation of altitude and the resultant variations in climatic conditions offers a suitable explanation for the survival of faunas.

Since it is an accepted fact that Africa has existed as a great land mass for a very long period, we may, therefore, assume that for the same reason it has always afforded conditions suitable for survival. The occurrence of *Deinotherium* in the Pleistocene deposits of Southern Abyssinia, Kenya Colony and Tanganyika Territory, proves the validity of such an hypothesis. It is, therefore, of the utmost importance that this possibility should be borne in mind during any attempt to correlate the deposits of East Africa with those of other parts of the world, since in the absence of sufficient stratigraphical evidence we can only compare the fossil remains.

On the other hand, as Dr. Hopwood has pointed out, the determination of the age of any deposit should depend upon the first appearance of new faunal types, and not upon the survival of earlier forms. In this connection, Haug's definition of the Pleistocene, as indicated by the first appearance of any one of the genera *Elephas*, *Bos*, or *Equus*, is well-founded, but at the same time it involves the consideration of "negative evidence." This is always a somewhat unsatisfactory basis, but in the present circumstances the amount of material obtained from the localities concerned, enables us to be fairly confident that a representative collection is at our disposal.

In the area from which the fossils described in this paper were obtained, we have the deposits of Kanam, Kanjera and certain other localities, which have yielded the remains of *Elephas* (in the general sense of the term) (MacInnes, 1942), *Bos* and *Equus*, and which have, therefore, been assigned to the Pleistocene. The fossil beds from which the material under consideration was obtained, have never yielded any of these three genera, and for that reason they are regarded as of pre-Pleistocene age. Comparison of the mammalian remains of these deposits with those of other parts of the world, shows that there is a distinct faunistic resemblance to those of Moghara in Egypt, of Sansan in France, and of the Bugti beds of Baluchistan. The Sansan series is known to be of Burdigalian age, whilst the deposits of Moghara and Bugti have been assigned to the same period on account of the similarity of their mammalian faunas. We have, therefore, a forward and a backward time limit, for we may assume that the fauna of the Victoria Nyanza basin is

probably not older than the Burdigalian, and is not as late as the Pleistocene.

A study of the Pontien fauna of Salonika shows that there, at least, a number of new forms, such as *Hipparion, Gazella* and others, which are not represented in the lower Miocene of Europe, and which are not as yet known to occur in the pre-Pleistocene of East Africa, had made their appearance. Thus, even if we admit the possibility of survival, it seems to be improbable that these fossil remains represent a period as late as the Pontien. In the present state of our knowledge, therefore, it will be convenient to regard these deposits as the East African representative of the Burdigalian.

M. Arambourg obtained some fossil remains from the Losodok Hills on the western shore of Lake Rudolf in 1932. The material appears to have been very fragmentary and limited, but since practically all the genera recorded are also included in the Rusinga collection, his suggestion that they should be referred to the lower Miocene is probably correct.

It is clear that further collecting in the East African area would be well repaid, and it is to be hoped that additional specimens will be obtained of those groups which at present are so poorly represented.

ORDER *PRIMATES*.
SUPERFAMILY *LEMUROIDEA*.
FAMILY *ANAPTOMORPHIDAE?*

Progalago gen. nov.

DIAGNOSIS.

A Lemuroid, in which the lower Pm.4 is monocuspid, the hypoconid being practically undeveloped. Greatest depth of horizontal ramus of mandible below M.3. Lower dental formula probably 2 : 1 : 3 : 3.

Progalago dorae sp. nov. (Genotype).

DIAGNOSIS.

A medium-sized Progalago, in which the lower molar series is about 10 mm. in length.

HOLOTYPE.

A fragment of left horizontal mandibular ramus, bearing Pm.4 and M.2. (Plate 23. Figs. 2, 2A and 2B.)

HORIZON.

Miocene.

LOCALITY.

Songhor, Kenya Colony.

Description.

Only the holotype is at present known. This small mandible fragment is broken anteriorly at the level of Pm.2, the posterior root-cavity of this tooth being exposed on the fracture surface. The extreme posterior point of the symphysis is present. Posteriorly the fracture begins immediately behind the M.3 root-cavity, and extends diagonally backwards and downwards, almost to the mandibular angle. The lowest point of the symphysis, which lies below Pm.3, is turned sharply downwards, forming a tubercle which projects well below the lower border of the ramus. The mental foramen is situated in the middle of the ramus, immediately above this tubercle, and below the posterior root of Pm.3. The least depth of the ramus is at the level of Pm.4, and the depth increases posteriorly. By calculation, based on the proportion of the molar-series length to the mandibular length, in modern galagos, the total mandibular length of this specimen must have been about 36 mm.

Dentition.

Pm.4 is monocuspid, with a large posterior talonid. The longer axis of the tooth is more oblique to the general line of the tooth-row than is usual in the modern galago, owing to the development of the antero-external, and the postero-internal angles. The protoconid is slightly more external than is the case in the modern East African galagos, and from its apex a sharp crest extends to the antero-external angle, while a second crest, directed straight backwards in the same line, extends to the postero-external point. A very faint tubercle is present at the base of this crest, which probably represents the hypoconid. Internally, a third crest is directed inwards and slightly backwards to the middle point of the lingual margin, and a distinct trace of the metaconid may be seen on this crest near the apex of the protoconid. The anterior and internal crests are directly united at their bases by the cingulum, which is produced from the latter into a wide postero-internal loop to the base of the posterior crest, thus enclosing a slightly concave talonid. The barrel of the protoconid is very distinct as a rounded vertical ridge on the external surface, whilst below it, a faint horizontal swelling round the lower margin of the crown, may represent an external cingulum.

M.2 is quadricuspidate, with the external cusps (protoconid and hypoconid) slightly in advance of the corresponding internal cusps (metaconid and entoconid). The protoconid and metaconid are connected by a distinct transverse ridge from their apices, whilst small anterior crests extend from the apex of each to the anterior cingulum, which is very well-developed. From the base of the protoconid, at its postero-internal point, a well-marked crest extends backwards, outwards and upwards to the apex of the hypoconid, whilst another crest from the corresponding point

of the metaconid, unites this cusp with the entoconid. The hypoconid and entoconid are also connected, by a transverse crest round the extreme posterior margin of the crown.

The measurements of the specimen, in millimetres, are as follows:—

Total length of fragment	26.4
Calculated mandibular length	36.0
Depth of ramus at Pm.4	7.0
Depth of ramus at M.3	8.8
Maximum thickness of ramus (at Pm.4) ...	3.4
Length of Pm.3—M.3. (approx.)	15.2
Length of molar series (approx.)	10.0

	Pm.3 approx.	Pm.4.	M.1 approx.	M.2.	M.3 approx.
Length ...	2.7	3.4 (long axis)	3.3	3.6	3.7
Breadth ...	—	2.3	—	3.4	—

Discussion.

This fragment, although so incomplete, is of considerable importance, in that it appears to be the first fossil representative of the *Galaginae* to be recorded from East Africa. In size, the animal was very little smaller than the existing *Galago kikuyuensis* Lönnberg, but certain structural characteristics clearly distinguish the fossil from any of the existing East African forms. The main points of difference are as follows:—

(1) The increase in mandible depth from front to back in the fossil, and *vice versa* in the modern animals.
(2) The monocuspidate lower Pm.4 in the fossil, and the relative insignificance of the hypoconid and metaconid.
(3) The oblique position of the long axis of Pm.4 in the fossil.
(4) The wider separation of hypoconid from entoconid in M.2, which in modern animals is about equal to that of protoconid and entoconid.

Unfortunately, no other fossil material is available for comparison and very little of the literature on extinct lemuroids. There appears to be a distinct similarity to *Necrolemur* of Filhol, from the Upper Eocene of Quercy, and it is possible that the new genus might be comparable to *Microchoerus* of Wood, from the Upper Eocene of Hordwell, but the mandible and lower dentition of the latter are at present unknown.

There is also a certain similarity to *Perodicticus* Bennet, in the form of M.2. In this modern genus, however, the posterior point of the symphysis is slightly further back, below Pm.4, and this tooth has retained its primitive form to a greater degree.

The large talonid in Pm.4 of the fossil may well be regarded as an intermediate stage towards the partially molarised Pm.4 of *Galago*, but it could hardly be regarded as ancestral to the simple tooth of *Perodicticus*.

It seems probable that the new fossil may be in the direct ancestral line of the modern galagos, for which reason the name *Progalago* is suggested. The specific name is taken from that of my wife, who found the specimen.

SUPERFAMILY *ANTHROPOIDEA*.
FAMILY *CYNOPITHECIDAE*.

Mesopithecus Wagner sp. ?

MATERIAL.

Part of the right horizontal ramus of a mandible (Plate 23, Figs. 1 and 1A) and some isolated teeth.

REMARKS.

These specimens were recovered from Rusinga and Kiboko Island. Most of the teeth are fairly well-worn, and the condition of the material is such that it cannot well be compared with other examples. Examination of fossil specimens in the British Museum shows that these teeth bear a distinct resemblance to those of *Mesopithecus*, and until better material is forthcoming there seems to be no reason to separate the African fossils from this genus.

DESCRIPTION.

Upper dentition.—Three examples of upper teeth are included in the collection which appear to represent M.2 and M.3. By measurement M.2 is very slightly broader than it is long, though in the unworn condition it appears to be relatively longer owing to the proximity of the outer and inner cusps. Four cusps are present, arranged in two lobes, and the cingulum is well-developed at either end of the tooth and absent on either side. The protocone gives rise to three crests, one of which is directed antero-externally to merge with the cingulum at the antero-median point, a second is directed transversely to the paracone, while the third extends postero-externally to the metacone. The hypocone has a very small antero-external crest which unites with that between the protocone and metacone at its middle point, while a second crest on the posterior surface of the hypocone curves outwards and merges with the cingulum. The protocone and metacone each have an anterior and a posterior crest. The lateral walls of the tooth converge sharply towards the apex, so that the breadth between the extremities of the cones is less than half the total breadth of the tooth. The posterior lobe is slightly narrower than the anterior.

M.3 is smaller than the preceding tooth and shows a greater constriction of the posterior lobe on account of the reduction of the metacone. In other respects the structure appears to be identical with that of M.2. The measurements of these upper teeth in millimetres are as follows:—

	Length.	Breadth Anterior.	Breadth Posterior.	Index.
M.2 ...	7.5	8	7	106
M.3 ...	6	6.5	5	108
M.3 ...	6.5	7.5	5.5	115

The mandible fragment has Pm.4—M.3 in place, in all of which the length exceeds the breadth. The ascending ramus begins as a slight horizontal ridge below the anterior border of M.2 which curves sharply upwards and is nearly vertical at the level of the posterior part of M.3. The lower border of the ramus is slightly concave antero-posteriorly, but the specimen is fractured at either end, and the full extent of this concavity is not apparent. The mental foramen is single and lies below Pm.4. The anterior fracture is oblique and extends backwards on the lower border to the level of M.1, so that it is impossible to determine the backward extension of the symphysis.

The mandibular dimensions in millimetres are as follows:—

Depth of ramus at M.1.	15
Depth of ramus at M.3	16
Thickness of ramus at M.2	7.5
Length of tooth row, Pm.4—M.3	25

Lower dentition.—Pm.4 is bicuspid, with two subequal cones closely united by a transverse crest. Anteriorly the cingulum is developed into a distinct shelf which bounds a small fovea anterior, while posteriorly it surrounds the large basin-shaped talonid. The wear is such that the structure of the talonid is obscured, but it appears that the hypoconid and entoconid were developed into distinct tubercles. The tooth is set obliquely in the alveolus, extending outwards towards the front. The broken roots of the preceding tooth are present from which it is clear that Pm.3 was larger and even more oblique than Pm.4.

M.1 is oblong with four cusps arranged at the four corners. The two outer cusps, protoconid and hypoconid, are much worn and have a somewhat selenodont pattern, by reason of the antero-internal and postero-internal crests of each cusp. The anterior crest of the protoconid and the posterior crest of the hypoconid unite with the cingulum at the middle point of the anterior and posterior borders of the tooth. The other two crests unite in the middle line of the tooth to form a distinct median longitudinal ridge. The metaconid and entoconid are fairly high

and pointed, and each has a slight external crest which extends transversely across the tooth to the opposite external cusp. The hypoconulid is absent, and the cingulum is only developed at the ends and not at the sides. M.2 is slightly larger than M.1 but is identical in structure.

M.3 differs from the preceding molars by the presence of a well-developed hypoconulid. This is situated immediately behind the hypoconid and in the same straight line with the hypoconid and protoconid, and the tooth thus has a more elongated appearance. The protoconid is still selenodont, while the hypoconid is more bunodont, with a small antero-internal crest which unites with the posterior crest of the protoconid. The median longitudinal ridge is thus retained, while the postero-internal crest is replaced by a very small projection connecting the hypoconid with the hypoconulid. The cingulum is developed anteriorly and on the postero-internal border between the entoconid and the hypoconulid. The measurements of these teeth in millimetres are as follows:—

			Length.	Breadth.	Index.
Pm.4	...	...	5	4	80
M.1	...	...	6	5	83
M.2	...	...	7	6	85
M.3	...	...	7.5	6	80

Discussion.

The structure of these teeth is almost exactly similar to that of *Mesopithecus pentelici* Wagner, but the lower molars are somewhat smaller than those of the latter species, and they are also relatively narrower. There is at present insufficient material for any close comparative study, and the material is, therefore, referred to this group.

In Europe, *Mesopithecus* first appears in the Pontien, where its remains are fairly frequent, and it is also known from China. Arambourg pointed out that the genus appears to have African rather than Asiatic affinities, and if this is so we might expect to find fossil remains of an earlier date in Africa. It has already been shown that no exact correlation has yet been made between the deposits of Africa and those of Europe, but there is a general concensus of opinion that the pre-Pleistocene deposits of the Victoria Nyanza basin from which these fossils were obtained, are Lower Miocene (Kent, 1941), or at least older than Pontien. It is thus particularly unfortunate that this material is so incomplete, for it seems very possible that it may represent an ancestral form from which the European *Mesopithecus* was derived.

By comparison with a modern *Colobus* monkey from East Africa we find that the lower dentition differs in certain features. Pm.4 of the fossil is fairly sharply oblique to the axis of the tooth

row, whilst in the modern form the longer axis of the tooth continues the line of the molar series. In the molars the outer cusps are more distinctly selenodont in the fossil, and the two transverse crests of each tooth appear to be more united by reason of the median longitudinal ridge, whereas in *Colobus* Illiger, the crests are sharper and more distinct. It seems probable, however, that in the more worn condition the teeth of the latter would approximate more closely to those of the fossil. The most marked difference in the molar series is the development of the hypoconulid in the third lower molar of *Colobus*. It is in the same straight line with the protoconid and hypoconid, as in the fossil, but it is a much larger cusp, and is entirely detached from the hypoconid projecting backwards as a distinct posterior lobe.

FAMILY *SIMIIDAE.*

Limnopithecus legetet Hopwood.

Type Locality.
Koru, Kenya Colony.

Material.
Four fragments of mandible from Songhor and Rusinga, with examples of the last premolar and the molar series.

Description.
The largest specimen consists of a right horizontal ramus with half of Pm.3 and Pm.4—M.1 complete (Plate 23. Figs. 3 and 3A). The teeth are very low-crowned, although only slightly worn. The bone of the ramus is deep and fairly narrow. On the external surface the ascending ramus begins to rise at the level of the anterior part of the third molar. A low but distinct ridge continues the line of the ascending ramus in a downward and forward curve which reaches its lowest point below M.1 and subsequently rises again to Pm.3. The mental foramen is single and is situated below the interval between Pm.3 and Pm.4, slightly below the middle point of the ramus. On the internal surface a shallow groove is present near the base which extends anteriorly into the simian pit.

Dentition.
Pm.3 is too incomplete for the structure to be seen. Pm.4 is rather broader than it is long, and is slightly bicuspid. The outer cusp, which is the larger, is situated almost in the middle line and is connected by a distinct crest to the smaller, inner cusp on the lingual margin. These two cusps are rather in advance of the middle point, and posteriorly the cingulum forms a wide flat shelf. Anteriorly the cingulum is also present,

connecting the bases of the two cusps to form a distinct fovea anterior.

The three molars all show a similar structure of five cusps arranged round the periphery, and they differ only in their proportions. The protoconid and metaconid are united by a crest similar to that connecting the cones of the premolar, while the anterior cingulum bounds the fovea anterior. A very slight crest connects the protoconid with the hypoconid, while the entoconid and the hypoconulid remain almost isolated. The latter cusp is situated practically in the middle line on the posterior margin. The cingulum is well-developed, particularly between the cusps on the anterior, external and posterior surfaces, but it is absent internally. M.1 is approximately oblong, being rather longer than broad. M.2 is slightly broader in front than behind, whilst in M.3, the hypoconulid is extended well backwards and produces an almost triangular outline.

The measurements of this specimen in millimetres are as follows:—

Mandible:			
Depth of ramus below Pm.3	...	...	17.5
Depth of ramus below M.3	...	...	17
Thickness of ramus below M.1	...	...	8
Length of tooth row Pm.4—M.3	...	...	22

Teeth:		Pm.4.	M.1.	M.2.	M.3.	M.1.	M.2.	M.2.	M.3.
Length	...	4.0	5.5	6.0	6.5	5.5	6.5	6.0	5.5
Breadth	...	4.8	5.0	5.7	5.2	4.5	6.0	5.0	4.8
Index	...	120	90	95	80	81	92	83	87

Discussion.

The genus to which these specimens are most obviously comparable, is *Limnopithecus* Hopwood, originally described from material obtained at Koru. One example of M.1, and two of M.2 in this collection, correspond almost exactly both in dimensions and also in structure, with the genotype of *L. legetet*, and the breadth index is necessarily very similar. Other specimens, however, whilst showing structural similarity, disagree in the length-breadth index. In spite of this, the material is regarded as belonging to *L. legetet* Hopwood, for reasons which are discussed in greater detail in the discussion on the two species.

Limnopithecus evansi sp. nov.

Diagnosis.

A species of *Limnopithecus*, in which the molars are slightly larger than those of the genotype. Lower Pm.4 appreciably longer than broad. Length-breadth proportion of molars generally less than 90. Horizontal ramus of mandible lower than that of genotype.

Holotype.

A fragment of right mandibular ramus, with Pm.4—M.3 in position (M.3 damaged). (Plate 23. Figs. 4, 4A and 4B.)

Paratype.

A right mandibular ramus and symphysis, showing the whole premolar—molar series, and with the roots of the incisors and canines in the alveolus. (Plate 23. Figs. 6, 6A and 6B.)

Horizon.

Miocene.

Locality.

Songhor, Kenya Colony.

Material.

Holotype, paratype, and one other fragment of left mandible bearing M.1 and M.2. (Plate 23. Figs. 5, 5A and 5B.)

Description.

Holotype (Plate 23. Figs. 4, 4A, 4B). This fragment is broken anteriorly in the middle of Pm.3, the crown of which is lost, and posteriorly about 2 mm. behind M.3. Pm.4—M.2 are in excellent condition, while M.3 lacks the posterior half of the crown. The body of the ramus is more slender and less deep than that of the specimen of *L. legetet* already described from the same locality. There is no apparent decrease in depth from front to back. The ascending ramus begins to rise at the level of the anterior part of M.3, as in *L. legetet*, but there is no trace of the ridge referred to in the description of the latter species, continuing the line onto the labial surface of the horizontal ramus.

The paratype (Plate 23. Figs. 6, 6A and 6B) consists of the right horizontal ramus, the symphysis, and a small portion of the left ramus. The right ramus is broken immediately behind M.3, and the left immediately behind Pm.4. The crowns of all the incisors, both canines and the right Pm.3 are broken, leaving the roots in the alveolus. The remaining teeth are largely complete, but the enamel is lost in parts, and weather action has obscured the finer structural details. The ramus is fairly low and stout, and the decrease in depth from front to back is very marked, especially on the lingual surface. With the alveolus set horizontally, the posterior point of the symphysis lies immediately below the principal cusp of Pm.4. The mental foramen is single, and lies below the middle of Pm.3. The line of the premolar—molar series is more sharply oblique to the axis of the ramus, than in the holotype, and the two series appear to have been almost parallel, while the rami converge at a fairly sharp angle. As a result of this arrangement, M.3 is situated well over from the middle line of the ramus, onto the lingual surface: thus the contrast in the depth of the ramus from front to back is very much more apparent on the lingual aspect than

on the labial. As in *L. legetet,* a shallow groove is present in the lingual surface of the horizontal ramus, which passes from the middle point of the ramus below M.3, forwards and downwards to end in the simian pit.

The third mandible fragment (Plate 23. Figs. 5, 5A and 5B) has the left M.1 and M.2 very well-preserved, but no other teeth are present. The body of the ramus is much damaged, but it appears to have been more slender and is distinctly less deep than that of *L. legetet.*

No maxilla fragments or upper teeth were obtained.

Lower dentition.—Incisors. The crowns of all the incisors are missing, but the teeth appear to have projected at an angle of 20°—25° from the vertical.

Canine. The roots show considerable lateral flattening, and suggest that the crown was fairly high and slender.

Pm.3, which is present only on the left side of the paratype, is monocuspid, with one anterior, and two posterior crests from the apex of the protoconid. The anterior crest follows the line of axis of the premolar—molar series, and ends in a distinct tubercle arising from the cingulum. The other two crests extend to the postero-internal and postero-external angles respectively, leaving an intervening flat area, forming a posterior shelf. The longer axis of the tooth lies obliquely, and the cingulum is well-developed round the inner and posterior margins of the crown.

Pm.4. Three examples of this tooth are present, all of which differ in one important character from the corresponding tooth of *L. legetet,* namely, the length-breadth index (see table of measurements). In all three the length is appreciably greater than the breadth, while in the latter species the breadth exceeds the length. The tooth is very slightly oblique to the general tooth-row axis, and is bi-cuspid, the outer cusp being the larger. In the paratype, the two cusps are united by a distinct crest, while in the holotype this is less well-developed. The two main cones are well in advance of the middle point of the tooth, and a small fovea-anterior is present, bounded in front by the well-developed cingulum. At the postero-external angle, a small tubercle occurs, which may represent the hypoconid. This is connected by a distinct crest, to the apex of the protoconid, while a similar crest from the apex of the metaconid, extends round the postero-internal angle, to the hypoconid, bounding a deeply concave talonid. Externally the cingulum is distinct.

Molar series.—The molars agree fairly closely with those of the genotype, but are slightly larger, and differ in their length-breadth proportions. M.1 is consistently the smallest of the series, and is distinctly more rhomboidal in outline than the M.1 of *L. legetet,* and also more so than M.2. The protoconid is larger than in the genotype, and is subequal in size to the hypoconid. As a result, the two pairs of cusps, protoconid-metaconid and hypoconid-entoconid are more nearly opposite

than is the case in the Songhor specimen of *L. legetet,* in which the hypoconid is almost alternate with the metaconid and entoconid. The hypoconulid is large and median. The greatest breadth of the tooth is at the posterior lobe.

M.2 is very similar in structure to M.1, but the outline is less rhomboidal, and the protoconid and metaconid are more widely separated.

The posterior end of M.3 is missing in the holotype, while in the paratype the weather action and wear have largely obscured the structure. It is clear, however, that the talonid was produced backwards, though it appears that it was somewhat wider and less constricted than in M.3 of *L. legetet.*

The first and second molars present in the third specimen show certain structural differences from the holotype and paratype. In M.1, the protoconid is large, and is situated rather further forward, which gives a more irregular outline to the tooth. The hypoconid is correspondingly further forward, and thus more nearly alternate to the metaconid and entoconid. In both M.1 and M.2, the hypoconulid is slightly more external. In spite of these differences, the specimen appears to be more similar in general to *L. evansi* than to *L. legetet.*

The measurements of these specimens, in millimetres, are as follows: —

HOLOTYPE:

Depth of mandible at M.1.	14.5
Thickness of mandible at M.1.	6.0
Length of tooth-row (Pm.4—M.3)	23.0

	Pm.4.	M.1.	M.2.	M.3.
Length	5.0	6.2	6.5	6+
Breadth	4.0	4.9	5.6	5.2
Index	80	79	86	—

PARATYPE:

Depth of mandible at Pm.3	18.5
Depth of mandible at M.1	16.0
Depth of mandible at M.3	15.2
Thickness of mandible at M.1	7.2
Length of tooth-row (Pm.4—M.3)	22.8
Length of symphysis	22.2

	Left		Right				(Roots.)
	Pm.3.	Pm.4.	Pm.4.	M.1.	M.2.	M.3.	(I.1 I.2 C.)
Length ...	6.0	5.2	5.2	6.0	6.4	7.0	(4.0 5.0 7.0)
Breadth .	4.2	4.0+	4.1	4.4+	5.5	5.3	(2.2 3.0 5.0)
Index ...	70	76.9+	78.8	73.3+	85.9	75.7	(— — —)

LEFT RAMUS:

Depth of mandible at M.3	15.7
Thickness of mandible at M.1.	6.8

	M.1.	M.2.
Length	6.6	7.1
Breadth	5.2	6.0
Index	78.7	84.5

Comparative measurements of M.1 and M.2 in *L. legetet* and *L. evansi* are as follows:—

		L. legetet type.	*L. legetet* Songhor.			*L. evansi.*		
M.1:								
Length	...	5.3	5.5	—	5.5	6.2	6.6	6.0
Breadth	...	4.9	5.0	—	4.5	4.9	5.2	4.4+
Index	...	92.5	90	—	81	79	78.7	—
M.2:								
Length	...	6.2	6.0	6.0	6.5	6.5	6.4	7.1
Breadth	...	6.0	5.0	5.7	6.0	5.6	5.5	6.0
Index	...	96.8	83	95	92	86	85.9	84.5

It is clear from the above table, that the first and second molars of *L. evansi* are slightly larger, and tend to have a rather lower length-breadth index than those of *L. legetet.*

Discussion.

Although it is apparent that these specimens are closely allied to *Limnopithecus legetet* Hopwood, the various differences of structural detail noted above seem to indicate that they do not belong to the same species. Dr. Hopwood, in his original description pointed out the following characters as being diagnostic of the genus:—

(1) Very low-crowned lower cheek-teeth.
(2) Length-breadth index of lower molars exceeding 90.
(3) Presence of distinct internal cingulum between the cusps.

The material at present under consideration may be said to agree with the first character, though the limits are not easily defined. It is decidedly opposed to the second character, while the third is a general characteristic, found in many other genera. Thus, superficially this new material, and also the Songhor specimens obtained in 1932, should be excluded from the genus *Limnopithecus,* since they disagree with the one definite diagnostic character. There is, however, no other genus with which the material bears close comparison, and to follow the literal interpretation of the diagnosis of *Limnopithecus* would necessitate the formation of a new genus. On the material available, such a course would be undesirable, and it would still be impossible to make an adequate generic diagnosis in anything but general terms, since all the specimens are so clearly comparable, in essentials, to *Limnopithecus.* For these reasons, the material collected at Songhor and on Rusinga Island in 1932, has, after comparison with the type, been included with the species *L. legetet,* despite the fact that some of the molars show a length-breadth index as low as 80, while in four out of the seven molars obtained, the index is below 90.

The new material, as already shown, exhibits several other minor points of difference, both from the type, and also from the 1932 specimens. These may be summarized again as follows:—

(1) The slightly larger size, and corresponding greater length of the Pm.-M. series.

(2) The lower and more slender horizontal ramus of the mandible.

(3) The tendency to a decrease in the depth of the ramus from front to back.

(4) The difference in the proportions of the cusps in the molars.

This material has, therefore, been distinguished as a separate species, for which the specific name *L. evansi* is employed, in recognition of Mr. Sam Evans' kind help and co-operation which has resulted in the discovery of so much interesting and important material on his farm at Songhor.

General Discussion.

In comparison of *Limnopithecus* Hopwood, with Fourteau's *Prohylobates*, we find that the total length of the molar series is the same, but whereas in the latter the three molars are all of equal length, those of *Limnopithecus* show a gradual increase in length from M.1 to M.3. The teeth also differ from those of *Prohylobates* by the presence of a distinct cingulum, although they show a certain resemblance in the distribution of the principal cusps, and in the central position of the hypoconulid.

The molars of *Limnopithecus* differ from those of *Hylobates* Illiger, in the greater development of the cingulum, and the higher breadth index. The position of the hypoconulid, on the other hand, appears to be very similar to that of *Hylobates*, except in M.3, where in the fossil it is produced as a backward lobe. In *Limnopithecus*, M.1 is the smallest of the molar series, while M.3 is less quadrate in outline, owing to the backward extension of the hypoconulid. In *Hylobates*, M.1 tends to be the largest of the series, and M.3 may be fully as quadrate in outline as the preceding molars.

The most striking feature in which the mandible of *L. legetet* differs from that of *Hylobates*, is the great depth of the horizontal ramus, and the sharp angle at which the ascending ramus rises. Moreover, the lower margin of the ramus is very slightly concave, and the depth is almost equal at either end, whereas in the recent form the lower border of the ramus is convex, and the depth increases appreciably from front to back. These points seem to suggest that *L. legetet* is a more primitive animal, if the low horizontal ramus, and wide angle of the ascending ramus be regarded as indicative of specialization. In these respects *L. evansi* is somewhat more similar to *Hylobates*.

The mandible of *Limnopithecus* compares more favourably with that of *Propliopithecus* Schlosser, from the Oligocene of

the Fayum. The latter is a rather smaller animal, but the relative depth of the horizontal ramus is very similar. The teeth, however, differ in certain respects; the breadth index is higher, the cingulum less developed, and the hypoconulid more central in position in the earlier form. In comparison with *Pliopithecus* Gervais, these new specimens are rather smaller, and the depth of the mandibular ramus is relatively greater, while the teeth, with the exception of M.3, are very similar. The latter tooth is more elongate in the African form, whilst in the European genus the posterior end of the tooth is more square.

Summary.

Comparison with these other genera suggests that *Limnopithecus* might well have been derived from the Fayum anthropoid *Propliopithecus,* but that it was probably not in the direct line to *Pliopithecus.* It seems possible that the three genera *Limnopithecus, Pliopithecus* and *Prohylobates,* may represent contemporary (Miocene) stages in divergent lines of development from the *Propliopithecus* stock. If the original form spread from the source of origin into other parts of the world, the migrating descendants would probably continue to develop along different lines, according to their different climatic conditions. Thus it would come about that at any given stage, representatives of the original stock taken from different geographical positions, would show varying combinations of primitive and specialized characteristics.

Xenopithecus koruensis Hopwood ?

Type Locality.

Koru, Kenya Colony.

Material.

A single upper molar (Plate 23. Fig. 12) and some mandible fragments from Rusinga and Songhor (Plate 23. Figs. 7—11).

Remarks.

The identification of this material is somewhat doubtful and should be regarded as only provisional. The specimens are distinguished from *Limnopithecus* on account of their larger size, but they are clearly too small for *Proconsul.* The presence of only one upper molar is unfortunate since it renders adequate comparison with the type of *Xenopithecus* impossible. In addition, there is no definite association between the one upper tooth and the lower teeth, and they can only be grouped together by reason of their size. The upper tooth appears to be M.1 in which case it agrees fairly closely in size with the corresponding tooth of the type specimen. Certain differences of structural details are, however, apparent, and it is possible that when more

complete material is available this example will prove to represent a different species. The lower molars are mostly in a poor state of preservation with the exception of a mandible fragment recently discovered by Dr. Leakey, and in any case it is impossible to make direct comparison, since the lower molars of *Xenopithecus* have not yet been described. The specimens appear to be approximately the size one might expect for the latter genus, and until further material is available it would be undesirable to make any distinction.

DESCRIPTION.

Right upper M.1 ? (Plate 23. Fig. 12).

This tooth is slightly-worn and very low-crowned. The primitive trigon is very distinct, with clearly-marked crests joining the three cusps. The internal surface of the protocone is somewhat worn, but it does not appear that the two ridges noticed by Hopwood in the first molar of *Xenopithecus* were ever present. In other respects the tooth answers Dr. Hopwood's description of the type specimen fairly closely. At the antero-external angle of the protocone a double crest is present, the anterior arm of which is derived directly from the protocone and slopes down to unite with the anterior cingulum. The posterior arm is less clear and appears to be an offshoot of the paracone. The postero-external crest of the protocone is directed diagonally across the tooth to the metacone and is equally derived from each cusp. A small crest uniting the protocone with the hypocone is apparently derived from the latter. On the external surface of the tooth a crest connects the paracone and metacone, which is equally derived from both cusps. In the valley between the metacone and hypocone a longitudinal crest is present which is apparently an offshoot of the postero-external crest of the protocone. The cingulum is present all round the protocone, and also between the two principal cusps on all four sides of the tooth, producing four foveae. The protocone, metacone and hypocone are subequal in size while the paracone is rather smaller.

The measurements of this tooth, in millimetres, compared with those of M.1 in the type specimen, are as follows:—

		Length.	Breadth.	Index.
Rusinga M.1	...	7.0	8.1	116
Koru M.1	...	6.8	8.3	122.1

Mandible.—A fragment of a right horizontal ramus from Rusinga has parts of Pm.4, M.1 and M.2 in place, but most of the enamel has been lost and the structure, therefore, cannot be determined. The bone of the ramus is relatively rather less deep than that of *Limnopithecus* and is slightly stouter. The mental foramen is single and is again situated below the interval

between Pm.3 and Pm.4. The ascending ramus begins to rise at the level of the anterior part of M.3, but it rises more gradually, and the line is not continued by an external U-shaped ridge as in *L. legetet*. The simian pit is shallow and the groove at the base of the internal surface is almost absent.

The measurements of this specimen, in millimetres, are as follows:—

Depth of ramus at Pm.4	22
Depth of ramus at M.1	22
Thickness of ramus at M.1	9

Another mandible fragment from Songhor (Plate 23. Fig. 8), which is provisionally assigned to this species, shows the whole of the symphysial area, but no teeth are present. The posterior point of the symphysis lies below the interval between Pm.3 and Pm.4, and is above the simian pit. The latter is very deep, and its lower margin, which is also the lowest point of the symphysis, is well in advance of the upper margin when the specimen is set with the alveolus horizontal. This lowest point is produced downwards into a distinct tubercle. From the upper border of the simian pit, the symphysis slopes upwards in a straight line to the incisor root-cavities. Anteriorly, the line of the symphysis is a gradual curve from the alveolus to the basal tubercle, the general line making an angle of about 55° with the alveolus. The mental foramen in this case is situated below the C.-Pm.3 interval.

The measurements of the specimen, in millimetres, are as follows:—

Depth of ramus at Pm.4	22.0
Thickness of ramus at M.1	10.0
Length of symphysis (I.1—basal tubercle)	27.3
External breadth at canines	24.7

Root cavities.	C.	I.2.	I.1.	I.1.	I.2.	C.
Length ...	9.0	6.0	5.1	4.8	6.0	8.5+
Breadth ...	6.0	3.1	3.0	2.9	3.5	6.0

Dentition.

A fragment of left horizontal ramus from Songhor (Plate 23. Fig. 10) has Pm.3—M.1 in place in a somewhat damaged condition. The anterior part, and the apex of Pm.3 are missing, but the tooth appears to have consisted of a large central cone and a very small talonid. The posterior wall of the main cusp shows a slight vertical groove which suggests that there was a tendency for the tooth to be bicuspid. The long axis of the tooth is sharply oblique to the axis of the tooth row as a whole, sloping forwards and outwards from the postero-internal angle.

Pm.4 is also damaged anteriorly, but it appears to have been more distinctly bicuspid, though less so than the correspond-

ing tooth of *Limnopithecus*. The external cusp is the larger, while the internal cusp is little more than a subsidiary tubercle of the main cusp. Parallel posterior crests slope down from each cone to the cingulum at the posterior end, enclosing a fairly deep talonid basin. Anteriorly, the cingulum is also developed into a small shelf. The long axis of the tooth is again oblique, but less so than that of Pm.3.

The first molar of this specimen is damaged at either end, but it is clear that it was composed of the usual five cones, with the hypoconulid in an almost median position at the posterior end. The cingulum is well-developed except on the internal margin.

Another example of left horizontal ramus (Plate 23. Figs. 9 and 9A) has the two premolars fairly well-preserved. Pm.3 is very oblique, the long axis making an angle of 55° with the line of the ramus. The apex of the protoconid is slightly damaged, but the tooth appears to have been monocuspid, with perhaps a very small trace of the metaconid. From the apex, a single anterior crest passes down to the well-developed anterior cingulum, while a postero-external crest continues the line of the anterior crest backwards to the postero-external angle. A third, more distinct crest from the protoconid to the postero-internal cingulum, encloses a small talonid basin. Pm.4 is bicuspid, the metaconid being slightly smaller than the protoconid, to which it is united by a well-defined transverse ridge. Anteriorly, from the apex of each of the principal cones, a ridge extends to the anterior cingulum, enclosing a distinct fovea anterior. Posteriorly, similar crests extend to the postero-external and postero-internal angles, enclosing a deep, concave talonid basin. The roots of the tooth are set even more obliquely in the alveolus than are those of Pm.3, and the longer axis of the tooth makes an angle of about 60° with the line of the ramus.

Another fragment of left horizontal ramus has Pm.4—M.2 in place (Plate 23. Fig. 11). The teeth in this case are complete, but seriously affected by weather action which has produced a severe pitting of the enamel. Pm.4 is very much more distinctly bicuspid than that just described, and is almost oblong in outline. The two cusps are separated by a deep groove and the cingulum is developed on all but the internal surface.

M.1 and M.2 show the usual molar structure with five cusps. The hypoconulid is median, and in M.1 extremely small. The cingulum is well-developed except on the internal border, and the enamel is very deeply wrinkled. This latter feature has probably been accentuated by the weathering. The breadth index of these teeth is distinctly lower than that of *Limnopithecus*.

Two very badly preserved fragments have the remains of the second and third molars in place, from which it can be seen that the hypoconulid of the third molar is again extended backwards, resulting in a somewhat attenuated appearance to the

tooth. Much of the enamel is missing from both these specimens so that the details of structure are obscured.

The measurements, in millimetres, of all these lower teeth are as follows:—

		Pm.3.	Pm.4.	M.1.	M.2.	M.3.
Length	...	7.5	6.0	7.0	8.0	9.0
Breadth	...	4.0	4.5	6.0	6.5	6.5
Index	...	53	75	85	81	72

		Pm.3.	P.m.4.	Pm.4.	M.1.	M.2.	M.1.	M.2.	M.2.	M.3.
Length	...	8.6	7.0	6.0	8.0	9.0	7.0	8.0	8.0	7.5
Breadth	...	5.2	5.2	5.0	6.0	7.5	6.0	7+	10.0	8.0
Index	...	60	70	83	75	83	85	87	80	93

It will be seen from the table of measurements that there is a certain variation in the size and in the proportions of these teeth. It is possible that these differences will eventually prove to be of specific or even of generic significance. On the other hand differences in sex might account for the extent of variation which is found, since the material may be divided approximately into two groups, one of which shows distinctly more slender structure than the other. [In the table these groups are shown with the more slender above, and the more massive (male ?) below.] On the evidence of such badly preserved material, I am inclined to adopt the latter view, since any specific separation would necessarily be based upon an exceedingly imperfect type.

The poor condition of these specimens renders any critical comparison with other forms a matter of great difficulty. The teeth are larger than those of *Propliopithecus*, and comparison with figures shows that Pm.3 is relatively larger and more simple. Pm.4 has a larger talonid, and the molars show an increase in size from before backwards, while those of the latter genus are subequal. The structure of Pm. 3 appears to be a primitive character, while the other features seem to show a greater specialization.

It is possible that *Xenopithecus* represents another offshoot of the *Propliopithecus* stock, but there is still insufficient evidence on which to base such conclusions.

Since the above was written, an additional mandible fragment has been recovered from Rusinga Island by Dr. Leakey, in September, 1942. Pm.4—M.3 of the left side are preserved, and, unlike any of the other teeth already assigned to this species, the enamel is in excellent condition (Plate 23. Figs. 7 and 7A).

Structurally, these teeth appear to be essentially similar to those already described, but the poor state of preservation of the latter renders exact comparison impossible. In size and proportions the teeth do not agree, and it is possible that when

PLATE 23. All figures natural size.

Fig. 1. *Mesopithecus* sp. Right ramus of mandible. Lingual.
Fig. 1A. *Mesopithecus* sp. Right ramus of mandible. Occlusal.
Fig. 2. *Progalago dorae*. (Genotype.) Left ramus. Occlusal.
Fig. 2A. *Progalago dorae*. (Genotype.) Left ramus. Buccal.
Fig. 2B. *Progalago dorae*. (Genotype.) Left ramus. Lingual.
Fig. 3. *Limnopithecus legetet* Hopwood. Right ramus. Lingual.
Fig. 3A. *Limnopithecus legetet* Hopwood. Right ramus. Occlusal.
Fig. 4. *Limnopithecus evansi*. (Holotype.) Right ramus. Occlusal.
Fig. 4A. *Limnopithecus evansi*. (Holotype.) Right ramus. Buccal.
Fig. 4B. *Limnopithecus evansi*. (Holotype.) Right ramus. Lingual.
Fig. 5. *Limnopithecus evansi*. Left ramus. Occlusal.
Fig. 5A. *Limnopithecus evansi*. Left ramus. Lingual.
Fig. 5B. *Limnopithecus evansi*. Left ramus. Buccal.
Fig. 6. *Limnopithecus evansi*. (Paratype.) Occlusal.
Fig. 6A. *Limnopithecus evansi*. (Paratype.) Right lateral.
Fig. 6B. *Limnopithecus evansi*. (Paratype.) Left lateral.
Fig. 7. *Xenopithecus koruensis* Hopwood. Ramus of mandible. Left lateral.
Fig. 7A. *Xenopithecus koruensis* Hopwood. Ramus of mandible. Occlusal.
Fig. 8. *Xenopithecus koruensis* Hopwood. Symphysial area. Occlusal.
Fig. 9. *Xenopithecus koruensis* Hopwood. Left lower Pms. Buccal.
Fig. 9A. *Xenopithecus koruensis* Hopwood. Left lower Pms. Occlusal.
Fig. 10. *Xenopithecus koruensis* Hopwood. Fragment of left ramus with Pm.3-M.1. Lingual.
Fig. 11. *Xenopithecus koruensis* Hopwood. Left lower Pm.4-M.2. Occlusal.
Fig. 12. *Xenopithecus koruensis* Hopwood. Right upper M.1 ?. Occlusal.

PLATE 23.

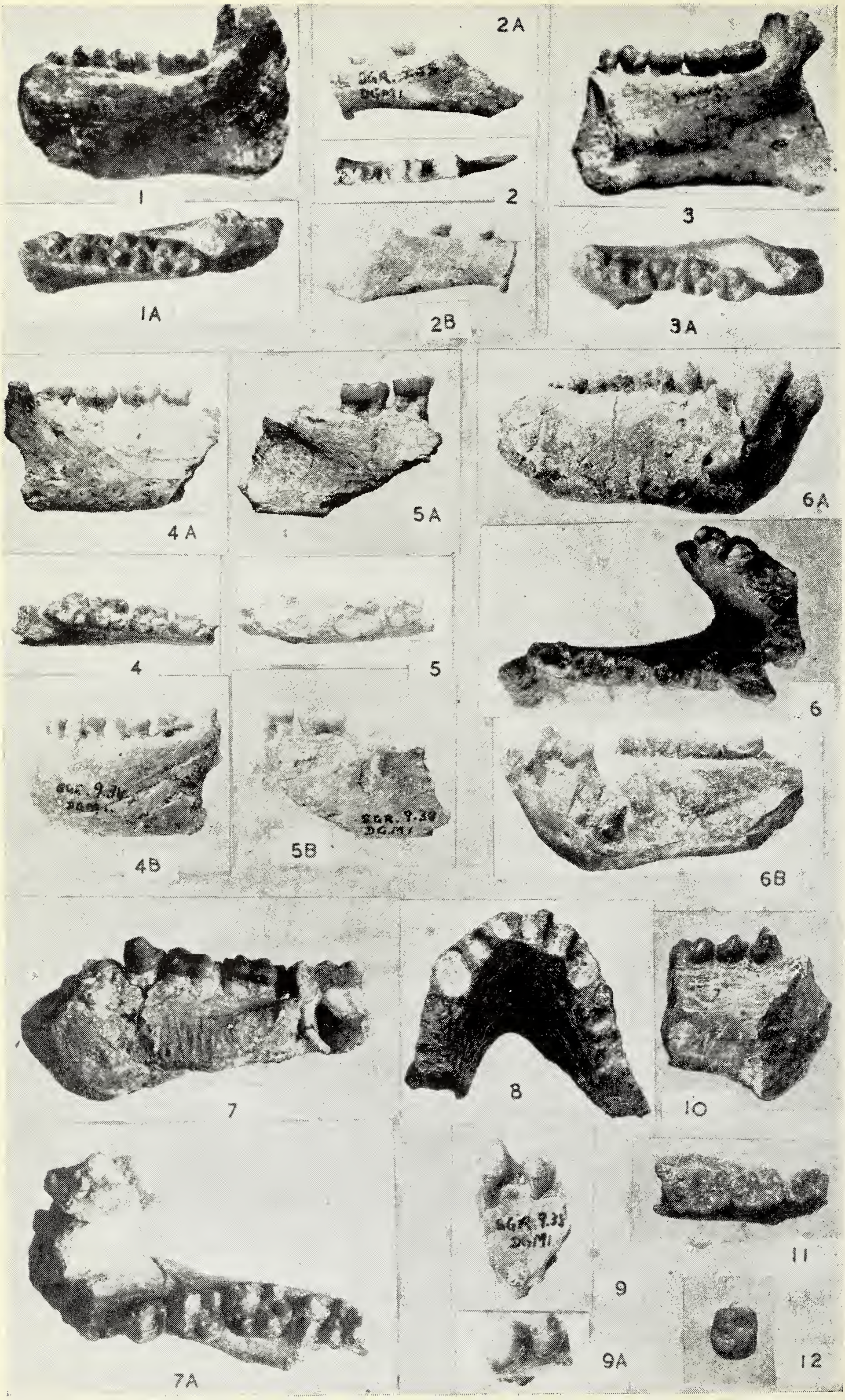

PLATE 24. All figures natural size.

Fig. 1. *Proconsul africanus* Hopwood. Palate.

Fig. 2. *Proconsul africanus* Hopwood. Left upper Pm.3-M.1.

Fig. 3. *Proconsul africanus* Hopwood. Right upper M.1.

Fig. 4. *Proconsul africanus* Hopwood. Left upper M.2.

Fig. 5. *Proconsul africanus* Hopwood. Right upper M.3.

Fig. 6. }
Fig. 7. } *Proconsul africanus* Hopwood. Associated upper and lower teeth.*

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*The left lower Pm.3 (Fig. 7) should probably have been set at a more oblique angle, when the teeth were mounted in plaster.

PLATE 24.

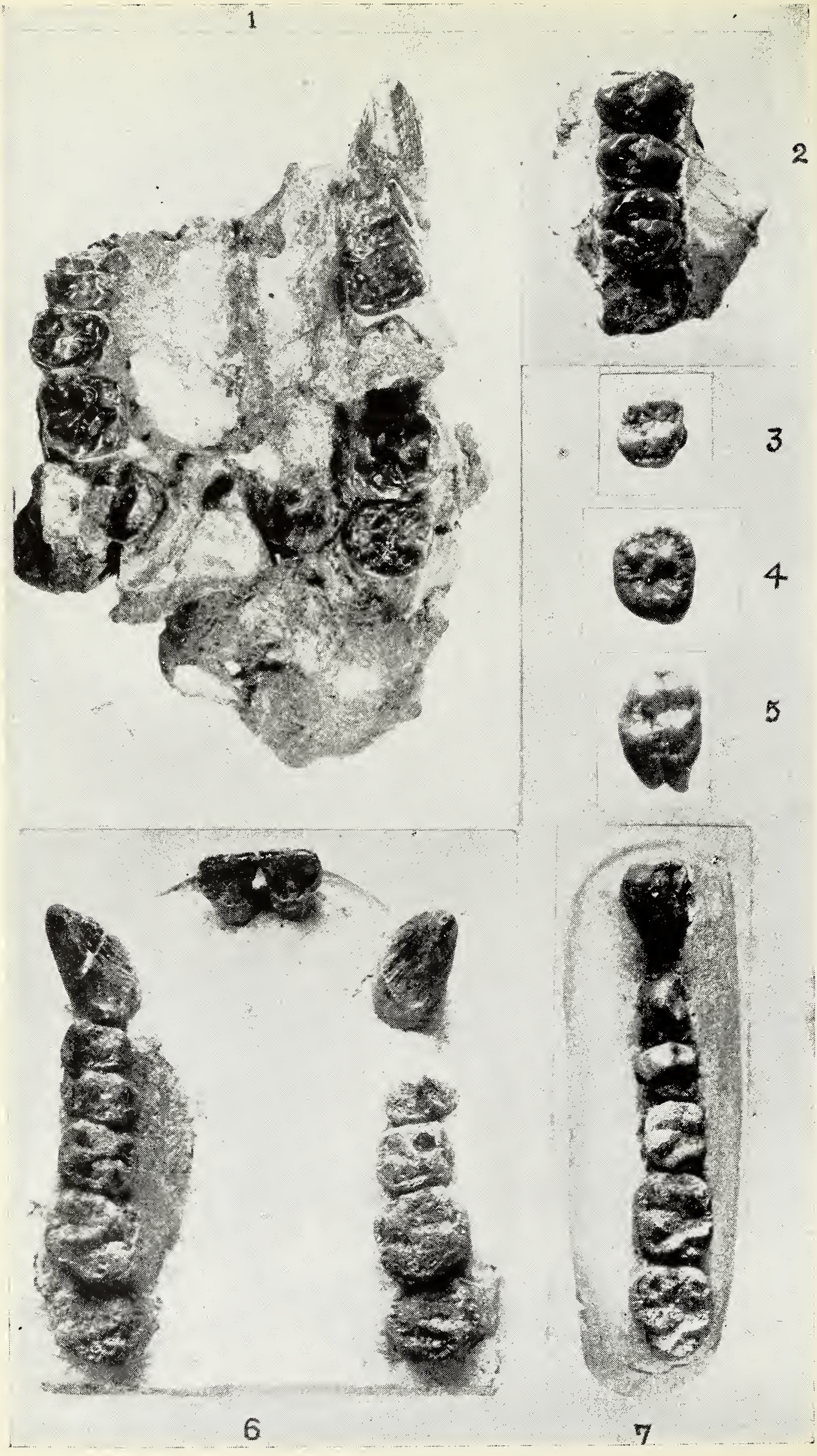


PLATE 25.

Fig. 1.

Fig. 2.

PLATE 25. Figures natural size.

Fig. 1. *Proconsul africanus* Hopwood. Facial fragment. Left profile.
Fig. 2. *Proconsul africanus* Hopwood. Facial fragment. Facial aspect.

PLATE 26.

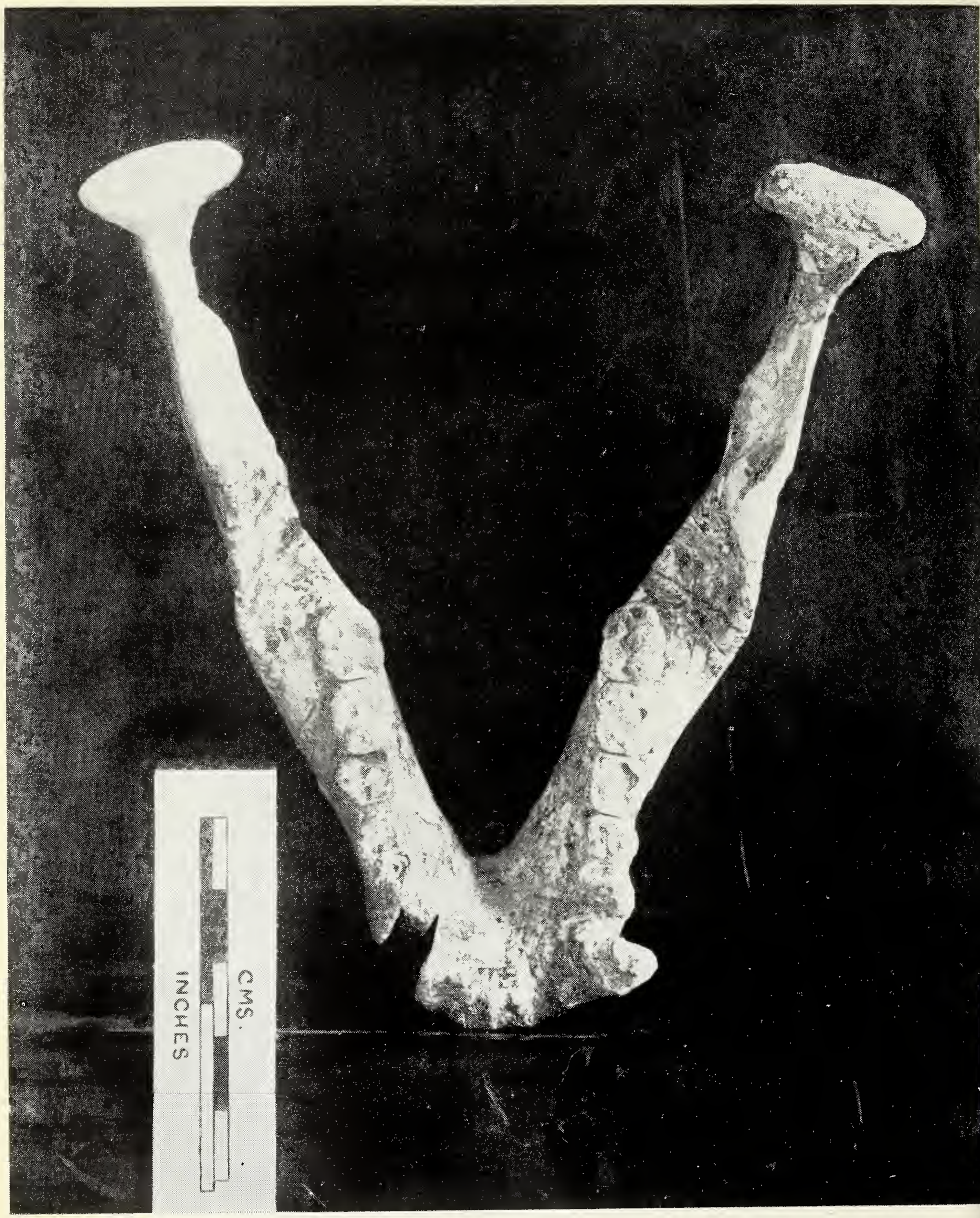


PLATE 26.
Proconsul africanus Hopwood. Rusinga mandible. Occlusal. Natural size.

Plate 27. *Proconsul africanus* Hopwood. Rusinga mandible. Left lateral. Natural size.

1

2

PLATE 28. Figures natural size.
Fig. 1. *Proconsul africanus* Hopwood. Rusinga mandible. Frontal.
Fig. 2. *Proconsul africanus* Hopwood. Rusinga mandible. Basal.

more complete material is available, particularly of associated upper and lower dentition, it may be found necessary to separate this larger variety, at least specifically, from *X. koruensis*. On the basis of this single specimen, however, it is not considered advisable to found a new species, and for this reason the mandible in question is provisionally assigned to *Xenopithecus koruensis* Hopwood.

The fragment consists of the upper part of the left horizontal ramus, from M.3 on the left side, to the middle of the root of Pm.4 on the right side, thus including the greater part of the symphysis. The lower border of the ramus is nowhere complete, so that the total depth cannot be ascertained. Anteriorly, the alveolus is considerably eroded between the roots of the two canines, so that the true form of the symphysis is obscure. On the internal surface there is a deep simian pit, and it appears that below this a simian shelf extended at least to a greater degree than in *Proconsul*.

Pm.4 is markedly bicuspid, with the metaconid well-developed. The cingulum is not very clearly defined.

The structure of M.1 and M.2 is so similar to those already described, that no additional description is required. In M.2, the hypoconulid is perhaps slightly more external in position.

M.3 has lost a portion of the enamel of the outer side, so that the maximum breadth of the tooth cannot be determined with accuracy. The hypoconulid is set well back, and almost in the same line as the protoconid-hypoconid. The tooth is very slightly worn anteriorly, whilst the talonid is quite unworn, and the enamel shows considerable crimping. The crown is supported by two roots, the anterior of which carries the protoconid and metaconid. This root is almost vertical for about $\frac{2}{3}$ of its length, while the lower third curves sharply backwards. The posterior root shows a more gentle curve throughout.

The measurements of these teeth, in millimetres, are as follows:—

	Pm.4.	M.1.	M.2.	M.3.
Length ...	6.2	8.1	9.8	11.0
Breadth ...	6.0	7.2	8.3	8.3+
Index ...	96	88	84	75+

N.B.—The maximum breadth of the first and second molars is across the talonid.

Proconsul africanus Hopwood.

TYPE LOCALITY.

Koru, Kenya Colony.

MATERIAL.

A crushed palate and part of the facial region of a fully adult animal, in which the incisors, one canine and one

premolar are missing. (Plate 24. Fig. 1. Plate 25. Figs. 1 and 2). Some associated upper and lower teeth of a single individual (Plate 24. Figs. 6 and 7). A juvenile mandible: a number of isolated fragments, including additional examples of upper and lower teeth (Plate 24. Figs. 2 to 5); and an almost complete mandible of a fully adult animal (probably a male) (Plates 26 to 28). The majority of this material was obtained from Rusinga Island. In addition, two tarsal bones from Songhor, and one from Rusinga, are also described as probably belonging to this species.

Description.

The palate and facial fragment has undergone considerable post-mortem deformation, but the greater part of the palate itself is complete. On the left side, the canine, premolars and first molar are undisturbed, while the second and third molars are displaced upwards for 30 mm. and 40 mm. respectively. The incisors are missing from both premaxillae. On the right side, the canine and Pm.3 are damaged; Pm.4 and M.1 are present and undisturbed; M.2 is displaced upwards about 5 mm., and M.3 is split longitudinally, the outer-half being twisted to face almost directly outwards, whilst the inner-half is forced upwards about another 10 mm. All the teeth are well-worn (Plate 24. Fig. 1).

On the upper surface, the premaxillary area is damaged, and it is impossible to determine the degree of prognathism. A very striking feature of the anterior view is the great length and relative narrowness of the nasal aperture and the nasal bones (Plate 25. Fig. 2). The base of the aperture seems to lie only just above the alveolus, but this may be partly due to the distortion. In profile (Plate 25. Fig. 1), the facial angle appears to be fairly steep, but again much may depend upon the distortion. The anterior part of the zygomatic arch has its origin very near the alveolar border over M.1. In another detached maxilla fragment, it is situated over Pm.4. The nasal bones are slightly displaced downwards by two parallel fractures which appear to follow the lines of the sutures. The two bones are fused together and have a flat surface with no median keel. If the two fractures are really along the lateral sutures as they appear to be, the bones themselves are even longer and more exactly parallel than those of the orang utang, and very considerably more so than those of the chimpanzee.

The teeth are severely worn, and will be described in greater detail from other specimens in which the structure can be more clearly seen. The premolars are bicuspid, the trigon of the molars is very distinct and the cingulum is well-developed. The canine is in closed series with the cheek teeth, while anteriorly a diastema of 5 mm. separates it from the socket of the lateral incisor.

The approximate measurements of this specimen, in millimetres, are as follows:—

Length of nasal aperture	37
Breadth of nasal aperture	19
Length of nasal bones	34
Breadth of nasal bones	10
Internal breadth of palate between canines ...	30
Internal breadth of palate between M.1 ...	34

Teeth (left side).	Length.	Breadth.	Height (external).
C. ...	15	12	24
Pm.3 ...	8	11	11
Pm.4 ...	6	11.5	8
M.1 ...	9	11	6
M.2 ...	12	13	6
M.3 ...	11	14	6

Upper dentition.—I.1. The root and base of the crown of the first incisor is roughly trihedral in section, with a flat surface to the front. The apex of the crown is sharply constricted from front to back, the anterior surface being gently convex from above downwards, while the posterior surface is rather sharply concave, producing a flat chisel edge. The median surface shows a pressure facet produced by contact with the first incisor of the other side, which lies at right angles to the cutting edge of the tooth, while the outer angle of the cutting edge is more rounded. From each of these two angles a very distinct crest curves downwards, backwards and inwards, the two uniting posteriorly. From the middle point of the posterior surface a massive enamel buttress extends from the base of the crown to a point about half way to the cutting edge. The enamel is considerably wrinkled, particularly on the posterior surface.

I.2. The root of the second incisor is nearly oval in section, with the longer axis from front to back. The anterior surface of the crown is somewhat expanded laterally, and is gently convex from above downwards and also from side to side. On the posterior surface the convex form of the root is produced almost to the apex where it becomes flattened across the top and sides into a distinct flange. The cutting edge of the tooth is more rounded, and there are no posterior crests from the apex. The enamel is again considerably wrinkled.

The measurements of some of the incisors are given below in millimetres. The term length, as applied to these teeth denotes the maximum distance from front to back. Owing to the inward curve of the alveolus this measurement is at right angles to the line of the alveolus instead of parallel to it as in the cheek teeth. Similarly, the breadth measurement of the incisors is along the line of the alveolus instead of transversely across it. The term height denotes the maximum external enamel height of the crown.

		I.1.				I.2.
Length	...	7	7.5	7	7	4.5
Breadth	...	8	10	9.5	8.5	8
Height	...	10	11	11	12	9

Canine. The root of the canine is oval in section, with the longer axis from front to back. The crown consists of a single massive cone, with a sharp crest from the apex to the posterior point of the base. Anteriorly, a second, more rounded rib, extends to the anterior point of the base. On either side of this rib a distinct groove is present which produces a partial isolation of the rib itself from the main cone. The cingulum is well-developed at the base of the crown on the lingual side. The enamel shows extensive vertical wrinkling, particularly on the lingual surface.

Pm.3 is bicuspid, with a massive protocone and a smaller deuterocone. From the apex of the protocone crests extend to the antero-external and postero-external corners of the tooth. The deuterocone has similar crests which curve sharply across the tooth along the anterior and posterior surfaces, to unite with those of the protocone at the external corners. It is probable that these crests merge into the cingulum on the anterior and posterior surfaces, but the distinction is not apparent. The inner surface of the protocone, and the outer surface of the deuterocone, are considerably wrinkled, so that the valley between the two cusps shows a complex enamel pattern of irregular ribs and grooves. The external and internal surfaces of the tooth show a much finer wrinkling of the enamel.

Pm.4 is rather smaller than the preceding tooth, and is more nearly symmetrical about the longitudinal axis. The deuterocone is larger and the protocone smaller, so that the two cones are subequal in size. The same crests are present, but in this case the external extensions of those of the deuterocone are distinctly formed by the anterior and posterior cingulum. The latter is produced in a small shelf round the postero-internal surface of the deuterocone. The enamel is again coarsely ribbed in the valley between the cusps, while the outer and inner surfaces are more smooth.

M.1 is roughly square in outline, with four subequal cusps. The cingulum is developed in different degrees in all the specimens. In some it is present only on the anterior and posterior surfaces, and is entirely absent on the internal and external margins. In others it corresponds exactly to Hopwood's description of the type specimen, in which he says "the crown is surrounded by a beaded cingulum which is discontinuous at each of the angles except the antero-internal." In the first molars of the palate already described it is only discontinuous for a very

short distance on the external surfaces of the paracone and metacone.

The cusps of the trigon are united by very distinct crests. From the apex of the protocone an anterior crest extends antero-internally, and merges with the cingulum at the middle point, of the anterior surface. A crest from the paracone is directed inwards to unite with the anterior crest of the protocone at its middle point. A second crest from the protocone is directed postero-externally towards the metacone, to meet an antero-internal crest from the latter cusp at the middle point of the tooth. The external crest, uniting the paracone and metacone, is also equally derived from either cusp. The hypocone is the largest of the four cusps and is practically isolated, but a faint crest affords a partial connection with the metacone, and bounds a small fovea posterior. A very slight projection on the anterior wall connects in wear with the postero-external crest of the protocone.

M.2 is larger and somewhat more rhomboidal than M.1 owing to the greater backward extension of the hypocone. The general structure of this tooth is almost identical with that of the first molar. The slight transverse crest is again apparent uniting the hypocone with the metacone. This can scarcely be traced in some of the more worn examples, but it is quite distinct in one unworn tooth. The cingulum shows the same varying degrees of development noticed in M.1.

M.3 is smaller than M.2 and is more rounded posteriorly owing to the great reduction of the hypocone and the partial reduction of the metacone. Most of the examples of this tooth in the collection are either greatly worn, or severely affected by weather action. A single unworn, and probably unerupted crown shows the same general structure as that of the preceding molars, with distinct crests uniting the three cones of the trigon. The enamel at the bases of the cusps is strongly crimped, and the cingulum, though weak on the external surface, is unbroken.

Amongst the upper molars a number of isolated examples are included (Plate 24. Figs. 2 to 5) which show distinct variation in size. In all the unworn examples, the crests uniting the cones of the trigon are more or less divided in the middle, especially those of the first and second molars. The unworn teeth also show a considerable crimping of the enamel both of the cingulum, and more particularly round the bases of the principal cusps. It appears that even a slight degree of wear eliminates most of the crimping, and also causes the crests of the trigon to appear more unbroken than is actually the case. The breadth of the premolars and molars exceeds the length in every case.

The measurements of the upper teeth, in millimetres, are as follows: —

	Right.				Left.			
	Lgth.	Bdth.	Hgt.	Ind.	Lgth.	Bdth.	Hgt.	Ind.
Associated upper teeth—								
C. ...	14	11	20	78	14	10.5	19	75
Pm.3 ...	8	10.5	11	131	—	—	—	—
Pm.4 ...	7	10.5	7	150	7	10	6.5	143
M.1 ...	10	11	6	110	9.5	11	5	115
M.2 ...	12.3	13	6	104	12	14	5	115
M.3 ...	11.5	13.5	5.5	117	11	14	5	127

	Length.	Breadth.	Height.	Index.
Left maxilla fragment—				
Pm.3	8.5	12	8	142
Pm.4	7	11.5	7.5	164
M.1	10	11	6	110
Associated right upper teeth—				
Pm.3	6.5	10	7.5	169
Pm.4	6	10	7	166
M.1	8	9.5	5	118
M.2	11	12	6	109
Isolated upper teeth—				
M.2	12	15.5	9.5	129
M.3	12	14.5	4	120

Lower dentition.—The lower dentition is less well-represented, and practically all the specimens have been subject to such extensive weather action that the smaller details of structure are lost.

Incisors. Only one example of a lower incisor is included which can with some degree of certainty be regarded as belonging to this species. This tooth is unerupted in the alveolus of a mandible fragment, and is clearly the second incisor. The crown is narrow, and flat on the inner surface. The anterior and posterior surfaces also are almost flat, and converge towards the apex to form a chisel edge. This specimen measures 11 mm. in height anteriorly, 6 mm. in length from front to back at the base, and 4 mm. in breadth across the cutting edge.

The canine consists of a single massive cone from the apex of which crests slope down to the antero-internal and postero-internal corners. Thus in transverse section the internal face of the crown is flat, while the remainder is rounded. A very faint vertical groove is present on the anterior surface. The cingulum is well-developed at the base of the internal surface, but it is absent elsewhere. The transverse section of the root is roughly triangular with rounded corners, having a flat surface to the front.

Pm.3 consists of a single somewhat caniniform cone, from the apex of which sharp crests slope down to the internal and posterior angles, whilst the antero-external angle is rounded. At

the base of the antero-internal crest, there is a small tubercle apparently derived from the cingulum. In the middle of the postero-internal crest a distinct swelling is present, which probably represents the metaconid. The two posterior crests are separated by a deep groove. The base of the postero-external crest is slightly damaged, but it appears that a very faint trace of the hypoconid was present. The cingulum forms a posterior shelf which unites the bases of the two crests, and it is also developed on the anterior part of the internal surface. Anteriorly, the enamel is produced downwards on to the anterior root.

Pm.4 is bicuspid, the outer cusp being the larger. The talonid is well-developed and has a pronounced hypoconid and a smaller entoconid. The cingulum is developed at either end. The protoconid and metaconid have slight anterior and posterior crests, which extend anteriorly to the cingulum, and posteriorly to the hypoconid and entoconid respectively. Transversely, they are united towards their bases to divide a small fovea anterior from the larger talonid basin.

M.1 is somewhat oblong in shape, with five cusps. The presence of a well-developed hypoconulid verifies Dr. Hopwood's view that this cusp was probably present in the first molar, although lost in all the examples originally described. The protoconid and metaconid are close together and are united by a transverse crest. The hypoconid is massive and isolated. The hypoconulid is almost in the middle line on the posterior border, and is united to the entoconid by a slight crest. The entoconid and metaconid are widely separated. The cingulum is developed between all the cusps except the entoconid and metaconid, on the internal surface. By analogy with the second molars it is possible that it was continuous round the protoconid, but the weathering is such that all trace of it at this point is lost.

M.2 is considerably larger and is relatively broader, with the five cusps arranged in the same manner. The crest between the hypoconulid and entoconid is much more distinct, and there is also a slight crest uniting the entoconid with the metaconid. The cingulum is present round the protoconid and between all the principal cusps except those of the internal margin.

M.3 is considerably narrower posteriorly, on account of the backward extension of the hypoconulid, which is practically in a straight line with the hypoconid and protoconid. In other respects the same general structure is retained. The cingulum again surrounds the protoconid and is faintly visible on the outer wall of the hypoconid. The crest between the entoconid and metaconid is quite distinct.

In all these lower molars the enamel of the basin enclosed by the five cusps is strongly crimped, as in the upper teeth. The outer surface appears to have been almost smooth. The length of the lower molars slightly exceeds the breadth.

The measurements of these teeth, in millimetres, are as follows: —

	Length.	Breadth.	Height.	Index.
Associated lower teeth—				
C.	12	9.5	19	79
Pm.3	10	7	9	70
Pm.4	8	8	7.5	100
M.1	10	8.5	6.5	85
M.2	13	11	6	84
M.3	14	12	6	85
Mandible fragment—				
Pm.4	7	6.5	7	92
M.1	9	8	5	88
M.2	11	9.5	5	86
Mandible fragment—				
Pm.4	7	7	—	100
M.1	10	8	—	80

A juvenile mandible, which is in a very bad state of preservation, and which has lost most of the teeth, is included in the collection. Pm.4 is present on each side, the posterior-half of M.1 on the left, and M.2 on both sides. All the teeth anterior to Pm.4 are broken at the alveolar level. M.1 is fully erupted, while Pm.4 is a little below the same level, and thus appears to have been incompletely erupted. The posterior part of M.2 is still embedded in the alveolus, and the germ of M.3 can be seen in the crypt behind M.2 where the ramus is fractured. Another fracture in the region of the symphysis exposes the crown of the permanent canine deep in the alveolus. The fragment measures 49 mm. from the alveolar border between the first incisors, to the posterior margin.

A left horizontal ramus represents an older animal, though still apparently immature. Pm.4-M.2 are present, while posteriorly the socket for M.3 is visible, but the general condition of the bone and the absence of a posterior pressure facet on M.2 suggests that the last molar was incompletely erupted. The ascending ramus begins to rise at the level of the posterior part of M.2. Anteriorly, the fragment is fractured through the root of the canine which is very massive, but it is impossible to determine the backward limit of the symphysis. The mental foramen is single, and is situated below Pm.4 about 10 mm. above the lower margin of the ramus.

The measurements of this fragment, in millimetres, are as follows: —

Depth of ramus below Pm.3	29
Depth of ramus below M.2	24
Thickness of ramus at M.1	13

Another mandible fragment is very much more massive. The roots of the canine and the premolars are in place, but the crowns are lost. The canine root is very stout and almost vertical. The symphysis appears to have been very upright, with practically no backward extension. The mental foramen is below Pm.4, 12 mm above the base of the bone. Above it, on the external surface, there is a large shallow depression, so that in transverse section at M.1, where the specimen is fractured, the ramus curves sharply outwards towards the base. The depth of the ramus at Pm.3 is 40 mm.

A mandible discovered by Dr. Leakey on Rusinga Island, in September, 1942, is of particular importance, since it is the most complete fragment hitherto recorded of *Proconsul,* or indeed of any of the fossil examples of the great apes.

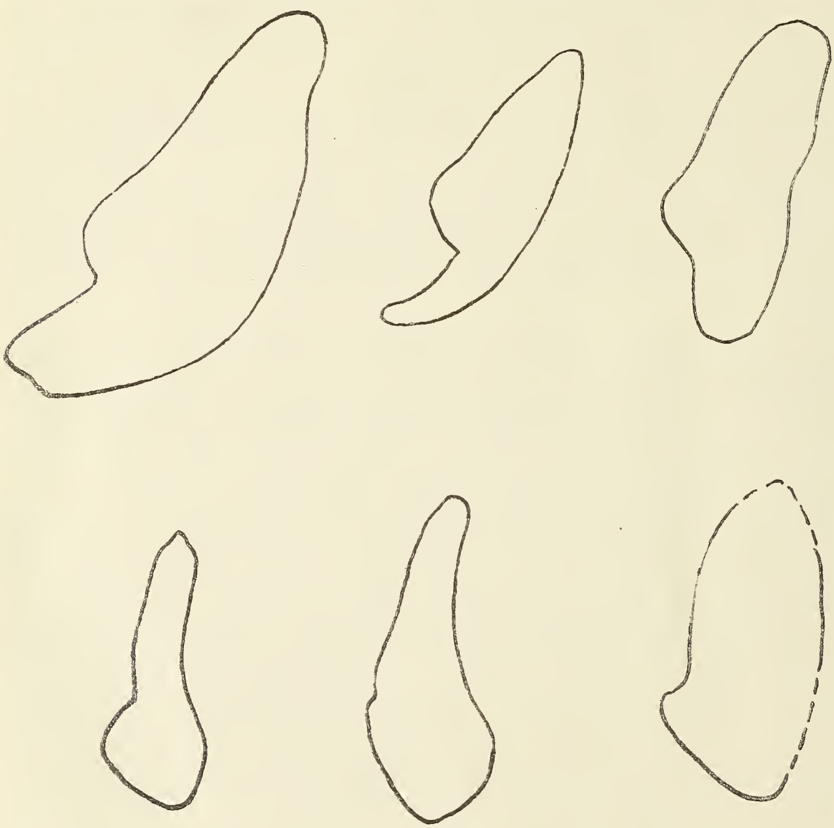
The preserved portions of the specimen are as follows: The condyle, a large part of the coronoid process, and some of the body of the left ascending ramus; the whole of both horizontal rami, including the canine and all the cheek-teeth of the left side, and the three molars of the right side; the symphysis, intact, and the anterior border of the right ascending ramus. The missing portions are the right condyle and coronoid, the bulk of the ascending ramus of that side, and the mandibular angles of both sides. The teeth are unfortunately severely affected by weather action, so that the finer details of structure are obscured, but it is clear that they are well-worn, and that the animal was fully adult.

The condyle measures 23 mm. transversely, by 10 mm. antero-posteriorly, with the long axis almost exactly at right angles to the general plane of the ramus. A sharp crest connecting the condyle with the coronoid, projects from the anterior edge of the articular surface at about 6.5 mm. from the external point. The general form is remarkably similar to that of the human condyle, and very different from that found in the few specimens of recent apes available for comparison. It is unfortunate that apparently no example of any simian condyle has hitherto been preserved as a fossil, so that the significance, or otherwise, of this feature cannot at present be determined.

The coronoid process appears to have been low, and rather close to the condyle, the apex being separated from the mid-point of the condylar articulation by a distance of 34 mm. The sigmoid notch is shallow, the lowest point being only about 13 mm. below a line connecting the apices of the condyle and coronoid, but since it has been necessary to reconstruct part of the latter, these observations cannot be regarded as exact. The anterior border of the ascending ramus appears to be almost parallel to the posterior border, but here again the latter is largely reconstructed, and thus not exact. The anterior border forms a sharp, straight crest from the apex of the coronoid process, to a point opposite the middle of M.3, and thence curves gently forwards as a

rounded ridge, to merge into the corpus below M.2. The external surfaces of both horizontal rami show very distinct concavities below the Pm.3-M.1 areas, which tend to accentuate the rather massive ridge produced by the canine root. The exact position of the mental foramen is obscured on both sides. The anterior part of the symphysial area hardly projects beyond a line connecting the front part of the two canine ridges. Thus, externally, the two horizontal rami are united by a nearly flat symphysial area, forming distinct angles with the bodies, and not by a rounded curve (Plate 28. Fig. 1). There is practically no decrease in the depth of the corpus from front to back. The form of the symphysis is best shown by the diagramatic section (Text Fig. 1). When set with the occlusal surface of the cheek-

A. B. C.



D. E. F.

Text Figure 1.

A.=Gorilla.
B.=Chimpanzee.
C.=*Proconsul africanus.*
D.=Modern African (Somali).
E.=Prehistoric African.
F.=Heidelberg mandible.

Text Figure 1.—Antero-posterior section through the mid-line of the symphysis of *Proconsul africanus* (C.), compared with similar sections of the modern Old-World Apes (A. and B.), and with those of three types of human mandible (D., E. and F.).

teeth horizontal, the most posterior point of the symphysis is the ridge above the simian pit, while the lower lip of the pit is almost vertical, and the simian-shelf wholly absent. This is a somewhat surprising condition for a primitive anthropoid, since the simian-shelf is much more pronounced in *Dryopithecus*, and even in *Eoanthropus*.

The measurements of the mandible, in millimetres, are as follows:—

Total length	121
Height of condyle	81
Antero-posterior breadth of ascending ramus (left side)	49
Vertical height of symphysis	38
Maximum length of symphysis	40.8
Depth of ramus at Pm.3	34
Depth of ramus at M.2	32
Depth of ramus at M.3	33
Length of tooth-row Pm.3-M.3	45.3
Length of tooth-row C.-M.3	58
Alveolar breadth at canine	35
Alveolar breadth at M.1	41.8
Alveolar breadth at M.3	49.8
Bicondylar width	112
Thickness of ramus at M.1	15
Condylar length	23
Condylar breadth	10

There is a distinct convergence of the Pm.-M. series from back to front, which is most clearly shown by the above measurements of the alveolar breadth (external) across the canines (35 mm.) and across the third molars (49.8 mm.).

Dentition.

Incisors. All the incisors are unfortunately missing, but it appears that they were fairly vertical.

Canine. The left canine is present, and nearly complete, but like all the other teeth, the enamel surface is severely eroded. The apex is damaged, but the tooth was certainly fairly low, probably projecting not more than 15 mm. above the alveolus. The cingulum appears to have been developed on the antero-internal border. The longer axis of the root-cavity lies at an angle of about 30° from the line of the symphysis. The canine is separated by small diastemata, both from the incisors and from the premolars, the former measuring 3 mm. at the alveolus, and the latter 2 mm.

Premolars. Only the left premolars are present, in which the details of structure are almost entirely obscured, but they appear to agree fairly closely with those already described. The longer axis of Pm.3 makes an angle of about 45° with the general line of the Pm.-M. series, whilst that of Pm.4 is slightly less oblique.

Molars. All the molars are present on both sides. M.1 shows considerable wear, that on the left side having a continuous lake of dentine, formed by the uniting of the metaconid, entoconid and hypoconid. M.1 of the right side reflects an abnormality which must have existed in the corresponding upper tooth. From a line connecting the extreme postero-internal point of the hypoconid to the posterior border of the metaconid, the whole of the posterior part of the crown is worn down at a sharp angle, the wear extending almost to the alveolus on the postero-external root. In structure, all the molars appear to resemble those already described in all essential features. The type of wear in the molars is perhaps of some importance, since they are all distinctly flattened, suggesting a somewhat lateral movement of the mandible in mastication, rather than the more vertical movement of the modern anthropoids. Another significant feature is that the greatest width of the first and second molars is across the talonid (entoconid-hypoconid) and not across the anterior lobe (protoconid-metaconid). According to Gregory and Hellman, this is a character which should indicate a development towards the human dentition.

The tooth measurements are as follows: —

	Left side.			Right side.		
	Length.	Breadth.	Index.	Length.	Breadth.	Index.
I.1 ...	6.6	4.0	60	6.8	4.0	79
I.2 ...	7.4	4.5	60	8.0	4.5	56
C. ...	11.0	8.7	79	—	—	—
Pm.3 ...	8.9	6.6	74	—	—	—
Pm.4 ...	8.5	6.5	76	—	—	—
M.1. ...	8.7	8.0	92	—	—	—
M.2 ...	10.3	9.2	89	10.8	9.3	86
M.3 ...	12.3	9.2	74	11.6	9.5	81

N.B.—The incisor measurements are taken from the root-cavity at the alveolus in each case.

A significant feature of all the worn molars in this collection, is the nature of the attrition, which is remarkably flat throughout. This implies a grinding movement in mastication, which in turn suggests the presence of a distinct glenoid cavity and articular eminence—a character usually associated with the hominids, and regarded as more advanced than the condition found in the temporo-mandibular articulation of all the known members of the *Simiidae*.

In addition to the material already described, Dr. Leakey obtained at Songhor a right astragalus and os calcis of a single individual, and on Rusinga Island a left astragalus, all of which clearly belong to a large primate, and which are of a size approximately equivalent to *Proconsul*. At both these sites teeth were found which can definitely be attributed to this genus, and

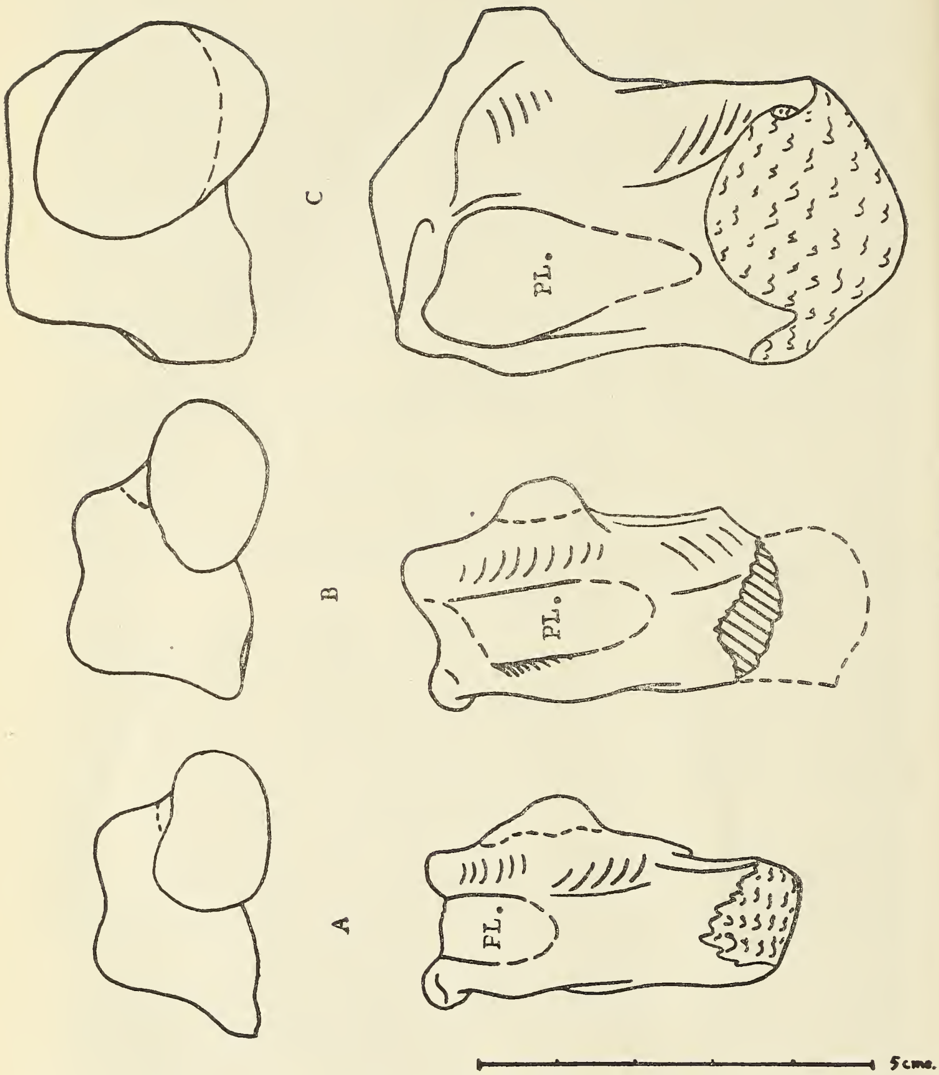
there can thus be little reasonable doubt that these bones are, in fact, the tarsals of *Proconsul*.

The upper surface of the astragalus has a large trochlear facet for the articulation of the tibia. This is convex from front to back, and concave from side to side, and it is slightly wider in front than behind. From the antero-internal angle of this facet the large rounded head projects obliquely forwards and inwards. The distal part of the head shows the articulation with the navicular, while the posterior part of the lower surface articulates with the calcaneum. The external part of the lower surface has an elongate facet which affords the principal articulation with the calcaneum. This is rather sharply concave from front to back, and it is separated from the lower facet of the head by a very deep channel. On the external surface a facet for the fibula is present, and internally another facet shows the point of contact of the internal malleolus of the tibia. The bone is only slightly compressed from above downwards, and expands in width towards the distal end.

By comparison with the astragalus of the chimpanzee, the most striking feature is the great depth of the body of the bone, and its relative compactness. The lower flange on the fibula side is relatively more massive and less extensive. The length of the head is rather greater than that of the modern animal which is distinctly a more primitive feature, but in other respects this bone appears to be almost intermediate between the chimpanzee and man, and it must, therefore, be regarded as more specialized than the former.

The tuber calcis of the calcaneum is broken, but it does not appear to have been very massive. The inner part of the upper surface has a large proximal facet which is oval in shape, and convex from front to back along the longer axis. This articulates with the astragalus, and is the converse of the large facet on the lower surface of that bone. On the anterior part of the upper surface a smaller facet is present which articulates with the lower part of the head of the astragalus. This is elongated longitudinally, hollowed at either side, and concave from front to back. The distal end of the bone shows a flat crescentic facet for articulation with the cuboid. The horns of the crescent are directed inwards, and between them the smooth surface of the facet curves over onto the inner surface of the bone.

The plantar surface is of particular importance since it shows a massive longitudinal ridge for the attachment of the plantar ligaments. This is very much larger than the corresponding region of the chimpanzee, which implies that the ligaments were stronger. In man, where these ligaments have to support a well-arched foot suitable for an erect posture, this ridge extends almost throughout the whole length of the bone.



Text Figure 2.

Text Figure 2 shows, above, the distal aspect of the right astragalus, and below, the plantar aspect of the os calcis from Songhor (B.), compared with similar aspects of these bones of chimpanzee (A.), and man (C.).

In view of Dr. Hopwood's suggestion that *Proconsul* is directly ancestral to the modern chimpanzee, the form of these tarsal bones is significant, if they are correctly assigned to that genus, for they appear to show a more hominoid, and, therefore, presumably a more advanced condition than would naturally be expected in any ancestral link.

Discussion.

The teeth of this collection differ somewhat in their dimensions from those of the type specimen and other examples originally described by Dr. Hopwood. The variation of the breadth index cannot be regarded as a very reliable character, and in comparison of the relative sizes of the teeth in the two collections, we must take into consideration the sexual differences which might naturally be expected. Dr. Hopwood points out that his holotype is the maxilla of a very much smaller animal than that to which his mandible fragment belonged. Moreover, comparison of these Rusinga specimens with the original material shows that the mandible fragment of this collection corresponds almost exactly with the holotype, whereas the palate, and the group of associated upper teeth which clearly represent larger animals, occlude perfectly with the Koru mandible.

It will be seen from the table of measurements of the first specimen of *Proconsul* to be described in this paper (i.e., the palate and facial fragment), that the Pm.3-M.3 series must have measured approximately 46 mm. In the Rusinga mandible, this measurement is found to be 45.3 mm., which indicates that the two animals were practically identical in size. These measurements agree more closely with Dr. Hopwood's paratype than with the holotype, and for this reason both animals are regarded as being probably males. It is also clear that the distortion of the facial fragment has not materially affected the facial angle, which adds weight to the view that *Proconsul* was a remarkably short-faced animal.

Some associated lower teeth in this collection which clearly belong to a single individual correspond to the larger form, and may, therefore, be more directly compared with the teeth of the Koru mandible. The most striking difference is in the proportions of Pm.3 which is considerably shorter in the Rusinga specimen, though almost the same in breadth, resulting in a higher breadth index. Pm.4, on the other hand, is rather longer and narrower, so that the index is lower. M.1 and M.2 in the Rusinga specimen are again longer and narrower. These differences of dimensions are, however, relatively slight, whilst the

more important structural characters of the Rusinga material are, on the whole, very similar to those originally described.

Consideration of these points, and in addition, of the fact that this new collection was obtained within a comparatively short distance of the type locality, seems to show that there is sufficient justification for regarding the differences of size, as characters of individual and of sexual significance rather than of generic or specific value.

The upper teeth of the larger, or male variety are very similar in size to those of *Dryopithecus* Lartet, but with regard to structure they differ in the same features referred to by Hopwood, namely, the strong cingula, the large hypocones, and the relative sizes of the cusps of the premolars. In the lower teeth, Pm.3 is relatively smaller, and shows the extension of the enamel on to the anterior root, which is a feature not found in any species of *Dryopithecus*. Pm.4 has a distinct hypoconid, and in the molars the anterior transverse crest is less pronounced. In M.3, the protoconid, hypoconid and hypoconulid are arranged almost in a straight line, and the cingulum is well-developed.

Dr. Hopwood distinguished the upper teeth of *Proconsul* from those of the gorilla on account of:—

(*a*) Their smaller size.
(*b*) The greater width and smaller length of the premolars.
(*c*) The greatly-reduced M.3.
(*d*) The pronounced cingula.
(*e*) The stronger crista transversa and crista obliqua.

These distinctions are equally applicable to the Rusinga specimens, and we may also add:—

(*f*) The more slender form of the first incisors.
(*g*) The lower and relatively stouter canines.

In discussion of the lower dentition, he pointed out that Pm.3 of *Proconsul*, in comparison with that of gorilla, was:—

(*a*) Smaller.
(*b*) Narrower.
(*c*) Shallower in the talonid basin.
(*d*) Less developed as regards the metaconid.

The last point does not apply to the Rusinga tooth, in which the metaconid appears to be as well-developed as that of the gorilla. The lower canine is again relatively lower and has a pronounced internal cingulum which is absent in the gorilla, while the lower molars differ in their smaller size, lower crown, and greater relative breadth.

Discussing the comparison with the chimpanzee, Dr. Hopwood gives the following list of characters in which *Proconsul* is found to differ in its upper dentition:—

(*a*) The anterior premolar is more caniniform.
(*b*) The premolars, especially Pm.4, are shorter.
(*c*) The molars have a prominent cingulum.

(*d*) The ridge joining the metacone and hypocone is present only in the first molar, and that tooth alone has a definite fovea posterior.
(*e*) The chimpanzee has the enamel more wrinkled.
(*f*) The entire premolar-molar series is cut at about the same time in *Proconsul,* whereas in the chimpanzee, the first molar erupts in the sixth year, and the third not before the fifteenth year (Zuckerman, 1928).

The Rusinga material agrees with the first three points, and shows, in addition, that the first incisors are more slender and that the third molar is very little smaller than the second, whereas in the chimpanzee, it may be considerably reduced. Point (*d*), however, does not apply to this collection, since the ridge connecting the metacone to the hypocone is visible in M.2, particularly in the unworn condition, while on the other hand, it does not appear to be a constant feature in the chimpanzee. With regard to the fifth point (*e*), some of the unworn teeth show a remarkable wrinkling of the enamel, but this feature appears in some cases to be obscured by quite a small degree of wear.

A fragment of maxilla has the third molar not quite completely erupted, though very nearly so, whilst the remainder of the teeth are in place, yet scarcely worn. This is in accordance with Hopwood's last point, that the entire premolar-molar series is cut at about the same time in *Proconsul*.

In the lower dentition represented by this collection, Pm.3 is a more slender tooth than that of the chimpanzee, and it is apparently more specialized on account of the greater development of the metaconid. Pm.4 is relatively narrower, and has both the hypoconid and the entoconid very much more distinct than the corresponding tooth of the chimpanzee. In the molar series of the fossil, M.1 is relatively smaller, and the two succeeding molars show a progressive increase in size, whilst in the existing genus they tend to be more nearly equal. This point is, however, a variable feature, and, therefore, not perhaps of very great significance. In consideration of the structure of the lower molars, it is found that the hypoconulid is more central in position, which must be regarded as an indication of the greater specialization of the fossil form.

From the foregoing discussion, it will be clear that there is at present no reason to separate this new material from *Proconsul,* since it agrees essentially both with Dr. Hopwood's original specimens, and also with the summary of the diagnostic characters as given by Gregory, Hellman and Lewis. For this reason all the *Proconsul* material described in this paper, although diverging in several respects from Dr. Hopwood's diagnosis of *P. africanus,* is, nevertheless, included in that species.

Owing to the present lack of comparative material, and also of literature, it is not proposed to enter into any detailed discussion, based on this material, on the relationship of *Proconsul* to other fossil examples of the great apes. Clearly, however, it is a somewhat generalized genus, in which a number of primitive characters are combined with some specialized developments. Amongst the latter, the following appear to be of some significance:—

(1) The short mandibular symphysis, and absence of the simian shelf.
(2) The reduced size, and high breadth index of the premolars and first molar.
(3) The increased width of the talonid in M.1 and M.2, which results in the maximum breadth being across the talonid.
(4) The shortening of the Pm.-M. series, indicating a relatively short-faced animal.
(5) The forward convergence of the Pm.-M. series.
(6) The flat type of wear of the molars, suggesting a somewhat human type of temporo-mandibular joint.
(7) The apparently hominoid development of the astragalus and os calcis.

This combination of characters appears to be incompatible with Dr. Hopwood's suggestion that *Proconsul* is in the direct ancestral line to the chimpanzee, since all the features enumerated show more of an approach towards the human condition than do the corresponding features of the modern animal. Gregory and Hellman express the view (*Ann. Transv. Mus.*, 1939, p. 350) that whereas Dr. Hopwood considered that *Proconsul* was "ancestral only to the chimpanzee," they regard it as "near to the stem of the entire ape-man stock" From this, it seems that they do not disagree fundamentally with Hopwood's view, but merely consider that *Proconsul* may have been ancestral not only to the chimpanzee, but possibly to many other genera as well. On the evidence of this new material, it seems unlikely that an animal which shows so many apparently hominoid characters, could have given rise to the modern genus, except by retrogressive evolution. Thus it becomes necessary to postulate either that the ancestral chimpanzee diverged from the common stock at a pre-Miocene date, or that the ancestral form which gave rise to *Proconsul* diverged at an earlier date, and happened to develop certain characters which we now regard as hominoid, whilst the main stem retained its more generalized characteristics, subsequently giving rise to the chimpanzee and other genera. The former hypothesis appears to be the more logical.

There is at present little material which is directly comparable with the South African genera, *Australopithecus*, Dart,

Plesianthropus Broom, and *Paranthropus* Broom, and the evidence does not suggest any close affinities with them.

In conclusion, it would appear that this new material does not support the contention that *Proconsul* is directly ancestral to the chimpanzee, but rather suggests a position nearer to the main ancestral line from which man was ultimately derived.

It is perhaps of interest to note that all the three genera of East African Miocene *Simiidae* at present known, where mandibular fragments showing the lower part of the symphysis are preserved, appear to have a poorly-developed simian shelf. This is most marked in *Proconsul,* where the shelf is entirely absent. In *Xenopithecus* it is indistinct, while in *Limnopithecus,* although apparent, the shelf is less clearly developed than in most of the *Simiidae.* The significance of this characteristic cannot at present be assessed, but it would seem that if the modern African Apes were in any way derived from the Miocene genera, the simian shelf can only be a comparatively recent development.

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NOTES ON THE GROUND AND POLISHED STONE AXES OF EAST AFRICA.

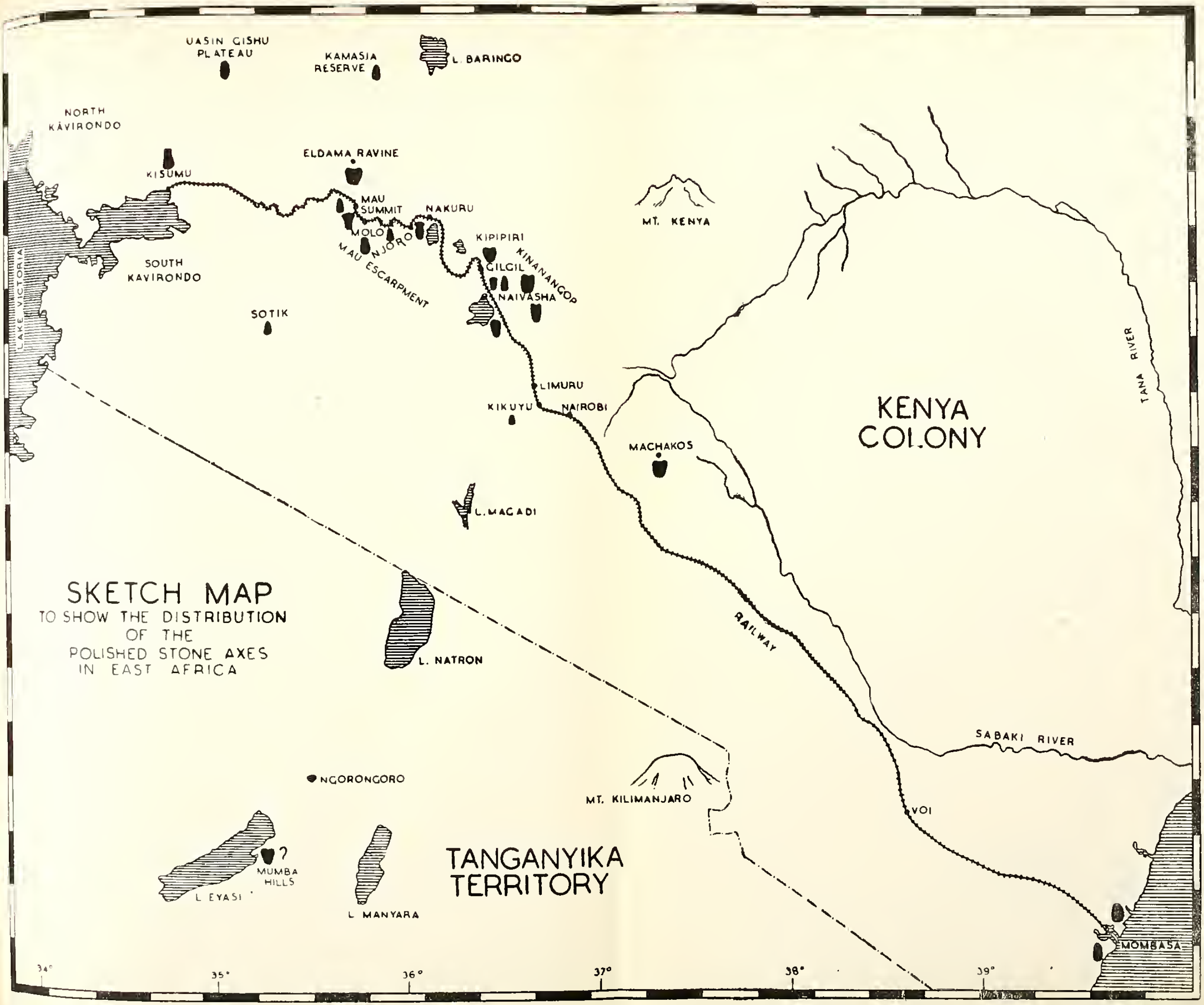
By Mary D. Leakey.

During the last thirty years, a number of polished stone axes have been discovered in East Africa. The majority of these have been chance finds made by farmers in the course of ploughing or other agricultural activities, with the result that little reliable evidence has been recorded concerning associated material or stratigraphy. In spite of this regrettable lack of data, the five types of axe represented among the 22 complete specimens known to exist appear to be sufficiently interesting and their occurrence in Kenya and Tanganyika, of sufficient importance to merit a short description.

Since the term "neolithic" is frequently applied to ground and polished stone implements and since it is permissible to assume for the present that the East African axes belong to this cultural phase, it may not be out of place to summarise the bases on which the term is applied in the area under review.

It seems that for the greater part of Africa, excluding the Egyptian field, the characteristics of the neolithic stage in cultural development are generally recognised as being somewhat different to those understood for Europe. There, the combination of agriculture, the domestication of stock, pottery and the grinding and polishing of stone implements are usually considered essential criteria and are frequently found together in the same context. In East Africa, on the other hand, where our knowledge is still extremely scanty, although two or more of the above features may be present, all four have not hitherto been discovered in association. Such negative evidence cannot, however, be regarded as particularly significant owing to the fact that the known characteristics of many cultures are still confined to the one-sided and incomplete evidence supplied by either a habitation or a burial site.

Pottery may be accepted as an early development in the area, but we have no reliable indications as to the date or phase at which agriculture, the domestication of animals and the grinding and polishing of stone implements were introduced. Moreover, it is unreasonable to assume that such radical changes were adopted contemporaneously by the whole population, which, as in modern times, presumably consisted of a number of different tribes living in varying stages of development who would necessarily borrow cultural elements from one another gradually and as opportunity arose: some continuing to live as hunters whilst others became fully-established agriculturalists and pastoralists.


UASIN GISHU PLATEAU
KAMASIA RESERVE
L. BARINGO
NORTH KAVIRONDO
ELDAMA RAVINE
KISUMU
MAU SUMMIT
NAKURU
MOLO
NJORO
MAU ESCARPMENT
KIPIPIRI
KINANGOP
GILGIL
NAIVASHA
MT. KENYA
SOUTH KAVIRONDO
SOTIK
LAKE VICTORIA
LIMURU
KIKUYU
NAIROBI
MACHAKOS
KENYA COLONY
TANA RIVER
L. MAGADI
RAILWAY
SKETCH MAP
TO SHOW THE DISTRIBUTION
OF THE
POLISHED STONE AXES
IN EAST AFRICA
L. NATRON
SABAKI RIVER
NGORONGORO
MT. KILIMANJARO
VOI
MUMBA HILLS
L. EYASI
L. MANYARA
TANGANYIKA TERRITORY
MOMBASA
34°
35°
36°
37°
38°
39°

From the available evidence, it appears that the makers of the East African cultures in the Rift Valley area, known as the Aurignacian phase C, the Wilton A and B, and the Elmenteitan(1) subsisted mainly as hunters and may be correctly described as Mesolithic on chronological grounds and because there appear to be no marked cultural changes to differentiate them from the Upper Palaeolithic other than the development of pottery, and, always excepting the anomalous Elmenteitan, an increasingly microlithic tendency in the industries. At some point in this phase we have the widespread appearance of the stone bowl, of querns and of pestle-rubbing stones at many sites of otherwise very different cultural facies, all of which, however, appear to be directly evolved from one or other of the Mesolithic industries. These new features are further accompanied by the adoption of systematic burials in cemeteries or mounds, many of which involved massive structures and may be taken to indicate a more settled mode of life. Using the term for the present in a somewhat localised sense, it is suggested that contexts in which stone bowls, querns and rubbing stones occur, together with systematic burials, may justifiably be described as Neolithic. On this basis, the Hyrax Hill, the Njoro and the Gumban A and B(2) variants of the Stone Bowl Culture would be included, although it is only in the last-mentioned that the existence of domestic sheep and cattle has been proved.

It is obviously outside the scope of this paper to discuss the complicated question of chronology in any detail, and future research must undoubtedly alter our present conception of the cultural factors involved. It may be stated, however, that the former non-hunting tribes of the Rift Valley area appear to have continued more or less in a Neolithic stage of culture from Mesolithic times until the advent of iron. The period at which this took place remains uncertain, but there is little reason to postulate an early date, since, whether it was introduced by an overland route from the north or by means of coastal trade, it is unlikely to have reached the area under review until well within the Christian era. Such meagre evidence as exists in the form of beads and other trade goods from the coast, which have been found associated with iron objects, would seem to indicate that the coastal route is the more probable.

It must be emphasised that the definition of the East African Neolithic suggested above is purely tentative, subject to amendment and revision as further evidence becomes available.

Among the polished stone axes found in East Africa, it is possible to distinguish five distinct types in which, however, some minor variations occur. The majority of the specimens appear to have been pecked and not ground into shape before the final polishing of the surface took place. With the exception of two centrally-grooved axes from Mombasa, no one type is confined to any particular geographical region, although, as will

be seen from the map, Plate 29, a marked concentration of finds occurs in the region of Molo, Njoro and Naivasha. The distribution does in fact coincide very closely with the areas of European settlement in which farming activities have been responsible for the discoveries. There is every reason to suppose, however, that the axes were more widely diffused and that other specimens will one day be found in districts which are at present undeveloped and little known from an archaeological point of view.

The five types of axe and the specimens in each category may be described as follows:—

1. Type A, Celts (Plate 30. Fig. 2. Nos. 1—8).

Celts in which the butts are relatively narrow although the width and form of the cutting edges is variable. Two specimens show expanded and markedly curved cutting edges and are typologically identical although differing in size; four are sub-triangular in form with nearly straight sides diverging to the cutting edge; one is more or less parallel-sided, with only a slight expansion at the cutting edge, and the eighth specimen narrows at both extremities and is of the biseau type.

(1) *Njoro, Forest Farm.*—Material: dolerite. Length 133 mm. Maximum width 77 mm. Entire surface polished although slight pitting can still be seen, especially towards the butt. Cutting edge curved and widely expanded. Butt end relatively narrow and slightly battered. Found in 1927, during the digging of trenches for the foundations of a house built for the late W. Sewall, Esq. The site was visited by Dr. Leakey shortly after the discovery had been reported and from a hurried examination he records that: "The foundation trenches exposed a number of shallow graves, in one of which a polished axe was found . . . Unlike any of the burial sites of other cultures so far found in Kenya, this site consisted of full-length graves for extended burials and all the graves exposed were parallel to each other. Unfortunately most of the human bones had disintegrated completely and only a few small fragments were found, but several small pieces of pottery and a number of obsidian flakes were found."[3] This site has since been almost entirely built over. (Coryndon Museum collection V7.16.)

(2) *Molo, Marindas Estate.*—Material: dolerite. Length 83 mm. Maximum width 55.5 mm. The cutting edge is rounded and relatively broad, as in the specimen from Forest Farm, Njoro. Butt end pecked but undamaged, remainder of surface smoothly polished. Discovered five or six years ago by the late Mr. C. T. Soames in the course of cultivation on his farm. A number of obsidian flakes and some unidenti-

fiable potsherds were also found in the same area. (On loan to the Coryndon Museum, V7.11.)

(3) *Naivasha, Karati River.*—Material: dolerite. Length 88 mm. Maximum width 64 mm. Sub-triangular in form with a relatively broad straight cutting edge, damaged by use. The upper and lower faces are somewhat flatter than is usual. Surface polished with the exception of the area near the butt, which shows pitting. Found by Mr. J. Wilson at a depth of 15 feet during the digging of a well near the lower reaches of the Karati River. (Coryndon Museum collection V7.3.)

(4) *Mau Summit, Kamara Estate.*—Material: dolerite. Length 117.5 mm. Maximum width 66 mm. Sub-triangular specimen with tapered butt and straight sides diverging to the cutting edge which is oblique and markedly sinuous. This feature may be due to resharpening after use since the edge is thick in section and somewhat blunt, although no chipping is visible. Cutting edge and lower part of implement polished, remainder evenly pecked. Found by Mr. Hemphill; no further data available. (Cast in Coryndon Museum, V7.17; original retained by discoverer.)

(5) *Kikuyu, Alliance High School.*—Material: dolerite. Length 67 mm. Maximum width 54 mm. Small, sub-triangular celt with flattened butt which is wider than is usual. The sides are nearly straight and diverge to the cutting edge which is curved and slightly chipped by use. With the exception of a polished area on either face near the cutting edge, the surface is pecked. Found by Mr. Cooper in a road cutting near the Alliance High School, during 1942. (Coryndon Museum collection V7.18.)

(6) *Sotik.*—Material: dolerite. Length 81 mm. Maximum width 60 mm. The cutting edge is sharp and curved with a slight twist; a feature which is also present on the celt V7.17. Butt rounded. Sides almost straight, but showing a slight constriction in the central portion. Surface smoothly polished near cutting edge, remainder pecked. Found by Major Dowson Currey on his farm at Sotik, and reported to have been associated with round stone balls in a deposit of murram. (Coryndon Museum collection V7.19.)

(7) *Kamasia Reserve, Kararuswa Location.*—Material: a fine-grained basic igneous rock. Length 82.5 mm. Maximum width 44 mm. A somewhat elongate, narrow specimen in which the lower-third only is polished, the remainder of the surface being pecked. Found by Mr. D. Storrs-Fox, District Commissioner, during 1924. (On loan to the Coryndon Museum, V7.2.)

(8) *Uasin Gishu Plateau.*—Material: olive green granitic rock. Length 66 mm. Maximum width 34 mm. The relatively narrow cutting edge of this implement is formed by

the intersection of two polished surfaces which are flat and not convex as in the remainder of the series, causing the edge to be chisel-shaped. Excepting these two planes, the surface is pecked all over. Original presented to the South African Museum by the Rev. J. du Plessis. (Cast in Coryndon Museum, V7.4.)

2. Type B, Horned or Lugged Axe (Plate 30. Fig. 2. (No. 9).

(9) *Molo, Leigh Farm.*—Material not identified. Length 166 mm. Maximum width 103.5 mm. Only one axe of this type is known. The butt is convex and greatly expanded laterally to form a massive lug or horn on either side. The lugs project well beyond the sides of the implement which is elliptical in cross section. The cutting edge is curved and sharp, and the sides nearly parallel although there is a slight constriction below the projecting lugs. Entire surface smoothly polished. Found by Mr. J. Henley during the digging of a well. Original retained by discoverer. (Cast in Coryndon Museum, V7.12.)

3. Type C, Bossed or Knobbed Axes
(Plate 31. Fig. 3. Nos. 10—14).

Seven complete and one fragmentary axe of this type are known. They vary from elongate to relatively short, squat specimens exhibiting in every case a boss or knob on either side of the butt which is concave in the centre. The sides are generally almost parallel but in one specimen converge towards the cutting edge. (Two of the complete specimens, obtained by Dr. Kohl-Larsen from Tanganyika Territory, cannot be described in these notes since they are now housed in a Berlin museum. Details of a third specimen have likewise had to be omitted since it is in the Cambridge Museum of Archaeology and Ethnology.)

(10) *Kinangop Plateau, altitude of 9,000 feet.*—Material: lava with augite crystals. Length 195 mm. Maximum width 103 mm. A massive, roughly-made implement, sub-rectangular in form with nearly straight, parallel sides. The butt is slightly concave and shows two incipient bosses which are not so pronounced as in the other axes of this type. The surface is pecked all over, including the area near the cutting edge which has also been heavily chipped and damaged by use. Found on the surface by Mr. Allen Turner during March, 1932. (Coryndon Museum collection V7.7.)

(11) *Kinangop Plateau, Hindmarsh Farm.*—Material: ? lava. Length 131 mm. Maximum width 64 mm. Elongate specimen with rounded cutting edge. The butt is markedly concave and both sides are slightly constricted below the

bosses. Entire surface pecked and not polished. Discovered during 1938 by Mr. Hindmarsh while ploughing land for pyrethrum. The site also yielded three complete and two fragmentary stone bowls, six pestles, a lower grindstone, potsherds and some obsidian implements. Although these objects were all obtained from the surface, they appear to have been derived from the same level within a limited area and may be presumed to be associated. (Coryndon Museum collection V7.10.)

(12) *Machakos District.*—Material: dolerite. Length 85.5 mm. Maximum width 72.5 mm. Entire surface polished. Cutting edge sharp and narrow in relation to the width of the butt; this is concave and shows two well-defined bosses. Discovered some years ago by Mr. Wilson during ploughing. A number of small stone burial mounds occur near the site of the discovery and it is possible that the axe was derived from one of these, since a number have been disturbed by cultivation. (Coryndon Museum collection V7.13.)

(13) *Eldama Ravine.*—Material: dolerite. Length 84.5 mm. Maximum width 80.5 mm. A short, squat implement in which the surface is carefully polished with the exception of the butt. This is concave and shows two particularly massive bosses which are pitted and also appear to have been damaged by use. The cutting edge is much chipped and has been worn obliquely. This was the first polished stone axe to be found in Kenya, and has been previously described.([4]) It was discovered in 1913, by Major Ross, D.S.O., at a depth of three feet among the roots of a tree which was being felled. (Coryndon Museum collection V7.14.)

(14) *Gilgil River Railway Bridge.*—Material: dolerite. A fragment consisting of one boss and part of the butt end of an axe of Type C. Found by Professor van Riet Lowe during 1937, in an erosion gully on the left bank of the Gilgil River near the railway bridge. In the same exposures and apparently derived from the same level, were found a number of obsidian implements, a grooved stone, a pestle and half a small bored stone made from quartzite. (Coryndon Museum collection V7.15.)

4. TYPE D, "HACHES A GORGES" WITH GROOVES AT THE BUTT END (Plate 31. Fig. 3. Nos. 15 and 16).

The two specimens in this class show nearly flat butts. In one specimen, this is completely encircled by a single broad groove, whilst the groove in the second is oblique and not continued on one lateral edge. The width of the cutting edges is very different in the two specimens, one of which, from Kisumu, is wide and curved, whilst the other, from Njoro, is narrow and chisel-shaped.

(15) *Kisumu Township.*—Material: dolerite. Length 119 mm. Maximum width 72 mm. Entire surface smoothly polished. Broad, rounded cutting edge and relatively narrow butt which is markedly flattened and shows a single, oblique, transverse groove approximately 22 mm. wide on the upper and lower faces and on one lateral edge. Found on the surface by Mrs. B. V. Shaw. (Coryndon Museum collection V7.5).

(16) *Njoro (ten miles south of).*—Material: ? lava. Length 98 mm. Maximum width 53.5 mm. Entire surface polished. Broad rounded cutting edge and relatively narrow and also at the butt. Narrow cutting edge and a flat, relatively broad butt encircled by a groove approximately 25 mm. in width. Both the cutting edge and the butt have been slightly damaged by native farm hands before the implement was taken over by Mr. Cowling, on whose farm it was found. (Coryndon Museum collection V7.9.)

5. Type E, "Haches a Gorges" with Central Grooves (Plate 31. Fig. 3. Nos. 17 and 18).

Both these implements were found at Mombasa and appear to be quite distinct from the up-country grooved axes on a geographical as well as on a typological basis. They have, therefore, been classed separately although both types fall under the heading of "*haches à gorges.*" In one example, there is a single transverse central groove and in the other, three parallel grooves, also placed centrally. Both are flat-sectioned and considerably more crude and irregularly shaped than the axes from the interior and suggest that the form may be largely dependent on the use of natural pebbles. Although the grooves have been pecked out, there is no trace of the pitting commonly found on the surface of the up-country specimens and the presence of some striae indicate that these two axes were ground into shape before being polished.

(17) *Mombasa, Meritini.*—Material: fine-grained brown sandstone or siltstone. Length 158 mm. Maximum width 101 mm. An oval, flat-sectioned implement. The cutting edge is greatly damaged by use, but a small portion remains intact and it appears to have been originally oblique or only slightly curved. The butt end is also battered. A somewhat irregular transverse groove has been pecked out round the centre of the implement, which, although the greater part of the surface has been ground, is noticeably asymmetrical in form and was perhaps manufactured from a pebble which received only a minimum amount of artificial shaping. Found by the late Mr. J. Rickman. (Coryndon Museum collection V7.8b.)

(18) *Mombasa, Flora Point.*—Material: fine-grained brown sandstone or siltstone. Length 209 mm. Maximum width 86 mm. This axe is very similar to V7.8b in material and general appearance and is clearly closely related although it is more elongate and there are three central grooves instead of one. The butt end is relatively narrow and has been damaged. With the exception of the area near the cutting edge and of a small portion near the butt which have been ground, the surface is rough and not polished. Some asymmetry in form again suggests the employment of a suitably-shaped pebble. Found by the late Mr. J. Rickman. (Coryndon Museum collection V7.8a.)

. . . . . .

In addition to the eighteen specimens described above, one complete and two fragmentary axes are included in the Coryndon Museum collection which cannot be assigned to any particular type; these are as follows: —

(19) *Naivasha, Longonot Sisal Estate* (Plate 30. Fig. 2. No. 19). — Material: probably serpentine or metabasalt. Length 107 mm. Maximum width 60 mm. Only the cutting edge and the lower-half of this implement have been artificially shaped and polished. The butt end is massive and very irregular, with a rough surface which appears to be entirely natural. The unusual sharpness and even curve of the cutting edge, suggesting that it was never used, perhaps imply that this is an unfinished specimen representing a stage in the manufacture of an axe belonging to one of the types described above. It is, however, equally possible that the form is intentional. Found by Mr. D. Macrae. (Coryndon Museum collection V7.6.)

Naivasha, Eastern Shore. (Not figured.) Material: ? lava, weathered. Maximum width 40 mm. Both extremities of this small implement have been so severely chipped and damaged that it is not possible to determine the original length or form. The cutting edge, however, appears to have been relatively narrow. Found during May, 1937, by Mr. H. J. Allen Turner on his plot by the shore of Lake Naivasha. (Coryndon Museum collection V7a.)

Naivasha, Eastern Shore. (Not figured.) Material: dolerite. A fragment of cutting edge which appears to belong to an implement of average size. Well-polished and evenly-curved. Also found by Mr. H. J. Allen Turner, near the site where the first fragment was discovered. (Coryndon Museum collection V7b.)

Materials.

The following notes on the probable sources of the materials have been contributed by the staff of the Kenya Geological Survey, who have been good enough to examine the specimens: —

The Dolerites (V7b, V7.3, 5, 11, 13, 14, 15, 16, 17, 18).—These resemble the newer dolerites supposedly of Karoo age of the goldfields and surrounding areas of the Kavirondo District.

The Lavas (V.7, 9, 10).—These are presumably from the Rift Valley Province, from periods of Tertiary and Pleistocene vulcanicity, but cannot be more precisely identified.

The Siltstones (V7.8a and 8b).—These are probably derived from the zone of sediments which extend from the coast to about 100 miles inland. They correspond with the description of the Maji ya Chumvi beds of the Duruma sandstone.

. . . .

Although the specimens are not available for description in the present paper, mention must be made of three additional bossed axes found in East Africa. Two of these were collected by Dr. Kohl-Larsen in 1933, during an expedition to the Northern Province of Tanganyika Territory. The actual specimens were seen by Dr. Leakey, in 1936, who reports that they are similar in every respect to the Kenya axe V7.13 from Machakos. The Tanganyika axes are alleged to have been discovered in small, stone-covered burial mounds at the Mumba Hills, near the north-east shore of Lake Eyasi, and are said to have been associated with pottery scored on the interior surface, of the type found at Gumban A sites in Kenya. Although the existence of these axes is unquestionable, their exact provenance and alleged association with Gumban A type pottery must be treated with reserve until more precise information is available. It is interesting to note, however, that small burial mounds, similar to those at Lake Eyasi, from which the two axes are said to have been obtained, are also known at the site where the Machakos axe was discovered. The third specimen, which also resembles V7.13, was found on Sir John Ramsden's estate at Kipipiri and is reported to have been associated with stone bowls and some obsidian flakes. This is now in the Cambridge Museum of Archaeology and Ethnology.

. . . .

Summary.

It will be seen that the only evidence of any value relating to the circumstances of the discoveries concerns the celt V7.16 from Njoro, which may be accepted as being derived from one of

the graves in the cemetery of full-length burials. There are, unfortunately, no indications as to the nature of the associated material and until a fresh site of the period is discovered, there can be no hope of obtaining further information since the Njoro cemetery is now almost entirely built over.* However, the provenance of a number of the axes found during recent years is known with some exactitude and the sites which have also yielded potsherds and obsidian flakes, etc., indicating the presence of associated remains, would undoubtedly repay investigation. Among these are Mr. Allen Turner's plot at Lake Naivasha; Marindas Estate, Molo; Mr. Wilson's farm, near Machakos; the Gilgil River site; and Mr. Hindmarsh's farm on the Kinangop Plateau. At each of these five sites some apparently contemporary objects have been found in addition to the axes themselves, and it is to be hoped that excavations will be undertaken before the information regarding their exact location has been lost or forgotten.

. . . .

A detailed correlation and comparison of the East African axes with those from other parts of Africa would clearly be premature in the current state of our knowledge, but certain points of similarity are so immediately obvious that it may not be out of place to comment on them briefly in this paper, if only for the sake of stimulating research on the further distribution of these axe forms in Africa. It must be stressed, however, that these notes are necessarily incomplete owing to war-time conditions which preclude access to relevant publications and the examination of comparative material. In fact, were it not for the co-operation of Mr. A. J. Arkell, Commissioner for Archaeology in the Sudan, to whom I am greatly indebted, not only for a great deal of information, but also for numerous photographs of specimens, even a short, preliminary note would be out of the question.

The East African celts appear to be of widely diffused and generalised forms, all of which occur in the Congo Basin(5) although certain other Congo types, which are also recorded from the Rhodesias, do not appear to have reached East Africa. The type of celt with curved, expanded cutting edge such as the Kenya axes V7.11 and V7.16 is also known in the Sudan and in Eritrea, where several specimens have been found on the surface of an occupation site at Kokan, near Agordat. This site has, moreover, yielded two concave butted axes which may possibly be distantly related to the Kenya knobbed axes with concave butts.

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*The culture associated with this type of celt was tentatively described by Leakey in "Stone Age Cultures of Kenya Colony," as the Njoroan. On the very limited data at present available, the application of a specific term does not appear to be justified and has not been employed in this paper.

Neither of the Kokan specimens, however, resembles the Kenya axes very closely, since the cutting edges are splayed and one example also shows a marked constriction below the butt.

Unlike the celts, the lugged or horned axe V7.12 from Molo must be regarded as a highly-specialised form. It has marked resemblances to axes found by Major Last at Ntani Haiek, near Agordat in Eritrea, and although more elongate, it also stands very close to five unpublished stone axes discovered by the Egyptian Exploration Society at a New Kingdom site at Sesibi in the Wadi Halfa District.*

Mr. Arkell regards both the Agordat and Sesibi axes as stone copies of the Egyptian two-lugged metal axe and there can be little doubt that his view is correct. It would seem likely that the Molo axe must also be ultimately connected with the same metal prototype; local evolution and consequent deviation from the original form being responsible for an increase in length and added convexity of the butt; features which are also present in the Agordat specimens.

Whether the bossed or knobbed axes were a fresh importation to the area, or whether the form was evolved independently as a more practical local development of the lugged prototype must remain an open question for the present. It would seem, however, that the latter is a more likely interpretation, and, if it is, in fact, correct, a transitional stage may possibly be represented by the massive axe V7.7 from the Kinangop Plateau in which neither the bosses nor the hollowing of the butt is as yet very pronounced.

Mr. Arkell informs me that bossed axes are unknown in the Sudan, and I have been unable to learn of any entirely similar specimens from other parts of Africa, the nearest analogy being in the two concave butted axes from Eritrea, mentioned above, which may conceivably represent yet another derivative from the common metal prototype. It should be mentioned that among the series of *haches à gorges* from L'Oued Beth, in Morocco, there is one specimen in which the butt shows a slight concavity.

The two Kenya specimens of *haches à gorges* with butt-end grooves appear to constitute the south-eastern limit of a type distributed over wide areas of North and Central Africa, where they are recorded from Algeria,(6) Morocco,(7) the South and Central Sahara,(8) the French Sudan, the Libyan Desert,(9) and the Anglo-Egyptian Sudan. Of these areas, Morocco alone had yielded some ninety specimens in 1938, about fifty of which were obtained from the *débris* of the prehistoric salt mines at L'Oued Beth. Amongst this series, one of the published specimens provides an almost exact parallel to the Kenya axe V7.9, from

*I wish to express my thanks to Major Last and to the Field Director of the Egyptian Exploration Society for permission to mention these unpublished specimens.

Njoro. The district of the Southern Sahara bordering on the French Sudan, known as Tenéré, has likewise yielded numerous examples and the Neolithic culture of this area which is characterised by the *haches à gorges,* pottery and querns has been considered sufficiently distinctive to be described specifically as the *Tenéréen.* Considerable numbers of these axes have also been collected from the surface in the Libyan Desert, notably at Wadi Howar and Jebel Tageru; certain specimens from the first area being closely allied to the Kenya axe V7.5, from Kisumu.

It is clear that as in the case of the lugged and bossed axes, in the *haches à gorges* we are dealing with a type either directly imported from elsewhere or developed locally in the areas concerned by parallel evolution from a common prototype. Until further evidence becomes available, particularly as to dating, it is impossible to hazard an opinion as to which interpretation represents the truth, although it should be mentioned that Breuil, Kelley and Reygasse have all suggested an eastern origin for the African *haches à gorges.*

Although axes with central grooves do occur in other parts of Africa, I am not aware of any exact parallels for the two Mombasa specimens. Moreover, since these are from the coast itself, they are likely to have had their origin in sea-borne influence, while the up-country series, whether they are regarded as direct importations or local derivatives from prototypes foreign to the area, are more likely to have reached East Africa by an overland route; possibly through the open country of the Great Rift Valley.

The route by which the polished axe forms reached East Africa must obviously remain problematical until a comprehensive archaeological survey has been made of the neighbouring territories, particularly of the Northern Frontier District of Kenya itself and of Ethiopia; where, on a geographical basis, the same forms might be expected to occur, if they are in fact derived from the north.

The polished axes already recorded from Ethiopia appear to have been collected from only two sites, viz., a series of fifty-seven specimens from the Tuli Kapi Plateau, now in the possession of Professor van Riet Lowe of the University of Witwatersrand,* and some twenty axes from Iubdo in the Uollega District, West of Addis Ababa.(10) The Tuli Kapi series includes blunted triangles, pointed ovates and a sub-rectangular form, none of which seem to have anything in common with the East African axes since the cutting edges alone are polished; the remainder of the surfaces being flaked all over and never pecked.

With the exception of one syenite specimen in which the whole surface has been polished, the axes from Iubdo are also

*I am greatly indebted to Professor van Riet Lowe for the information concerning the Tuli Kapi axes.

reported to be flaked and chipped into shape. This series is alleged to have been obtained from a gold working area and from the *débris* of platinum mines, but the association cannot be accepted unconditionally until more reliable information becomes available. No associated material is known for the Tuli Kapi axes.

Turning to the south; a considerable number of polished stone axes have been discovered in Northern Rhodesia, many of which have been prepared by the pecking technique.(11) They appear to consist largely of Congo types and include pear-shaped and sub-triangular celts; single and double ended rectangular specimens; a hexagonal form, and also a number made of natural pebbles or rock fragments in which the cutting edges alone have been polished. The sub-triangular and double-ended rectangular types have both been found at Wilton sites; an association which also holds good for a number of axes from Southern Rhodesia.(12) In this area, elongate celts with tapered, pointed butts have been found, together with sub-triangular and sub-rectangular forms. A number of specimens made of natural pebbles also occur.

Within the Union of South Africa, polished stone axes become increasingly rare and only a few are described as being shaped entirely by human agency. These, however, include one remarkable perforated specimen from the Transvaal which is reported to have been found with a bored stone or *kwé*.(13) A somewhat roughly made axe with a groove partly encircling the butt was found in a rockshelter in Cape Province with a Wilton kitchen midden industry.(14) A similar association is also claimed for an elongate chisel-like specimen from East London(15), and these discoveries would seem to indicate that in South Africa, as in Northern and Southern Rhodesia, a proportion of the polished stone axes should be assigned to the Wilton and probably belong to the later phases of that culture represented by the shell mounds of the coastal zone and of the great lakes of Central Africa.

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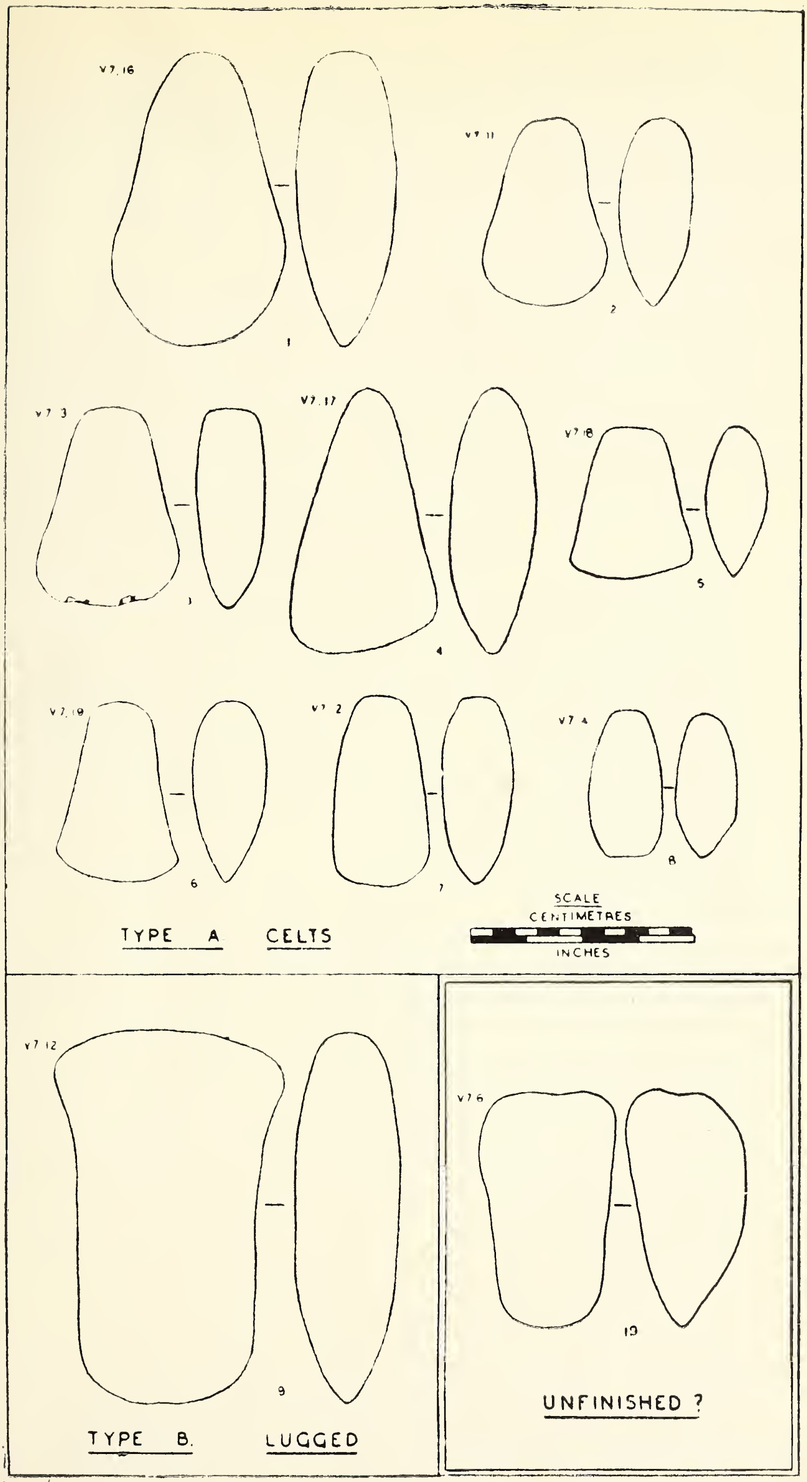
V7.16
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V7.3
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V7.2
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V7.4
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TYPE A CELTS
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V7.12
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TYPE B. LUGGED
V7.6
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UNFINISHED ?

Fig. 2.

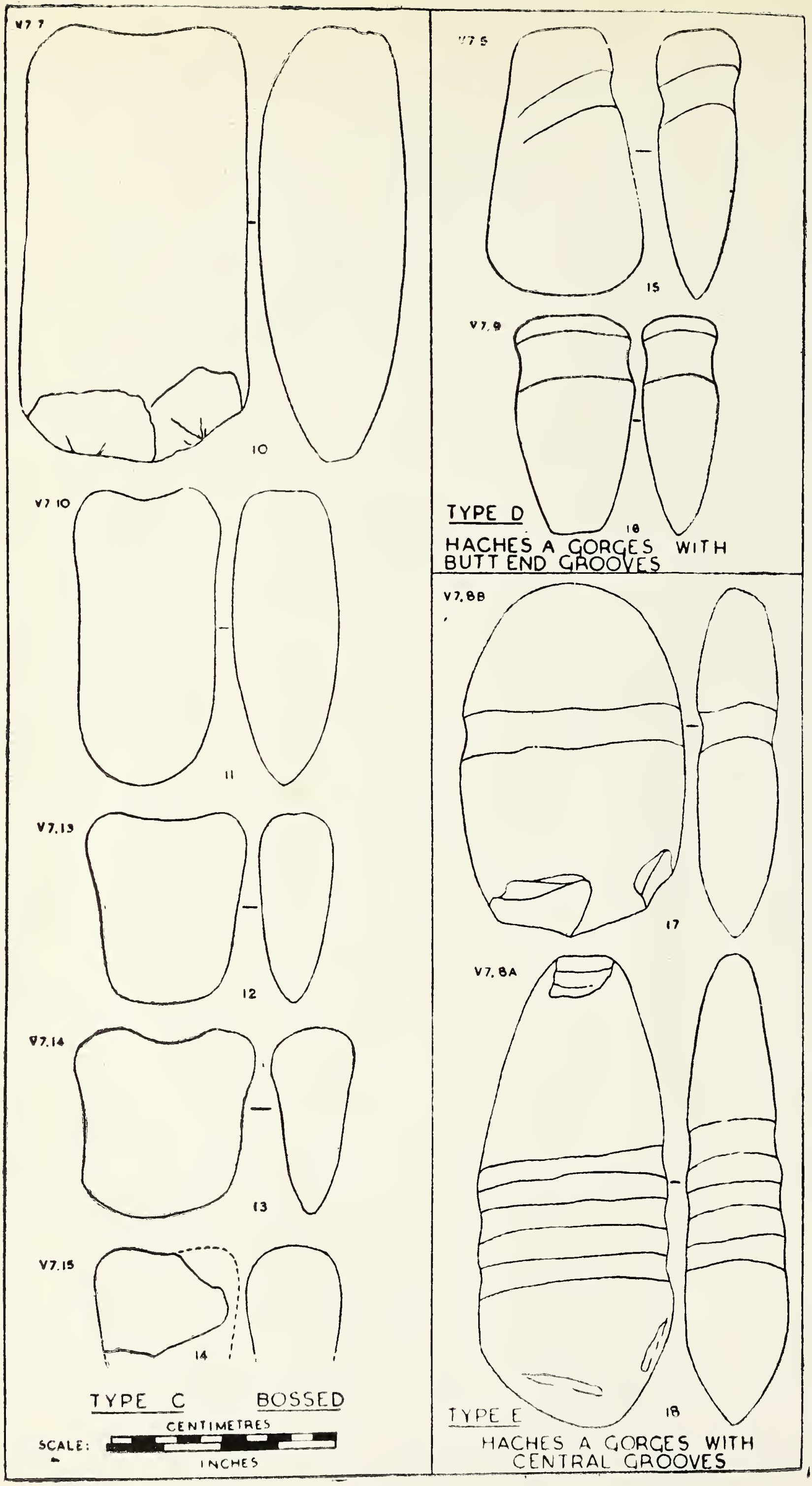

V7.7
10
V7.10
11
V7.13
12
V7.14
13
V7.15
14
TYPE C BOSSED
SCALE:
CENTIMETRES
INCHES
V7.5
15
V7.9
16
TYPE D
HACHES A GORGES WITH
BUTT END GROOVES
V7.8B
17
V7.8A
18
TYPE E
HACHES A GORGES WITH
CENTRAL GROOVES

Fig. 3.

PLATE 32.

TYPES OF EAST AFRICAN POLISHED STONE AXES.

Type A. Celts.
No. 1, V7.11 from Marindas Estate, Molo.
No. 2, V7.3 from Karati River, Naivasha.

Type B. Lugged or Horned Axe.
No. 3, V7.12 from Leigh Farm, Molo.

Type C. Bossed or Knobbed Axes.
No. 4, V7.7 from the Kinangop Plateau.
No. 5, V7.10 from the Kinangop Plateau.
No. 6, V7.13 from Machakos.

Type D. Haches a Gorges with Butt End Grooves.
No. 7, V7.5 from Kisumu.
No. 8, V7.9 from Njoro.

Type E. Haches a Gorges with Central Grooves.
No. 9, V7.8a from Flora Point, Mombasa.

PLATE 33.

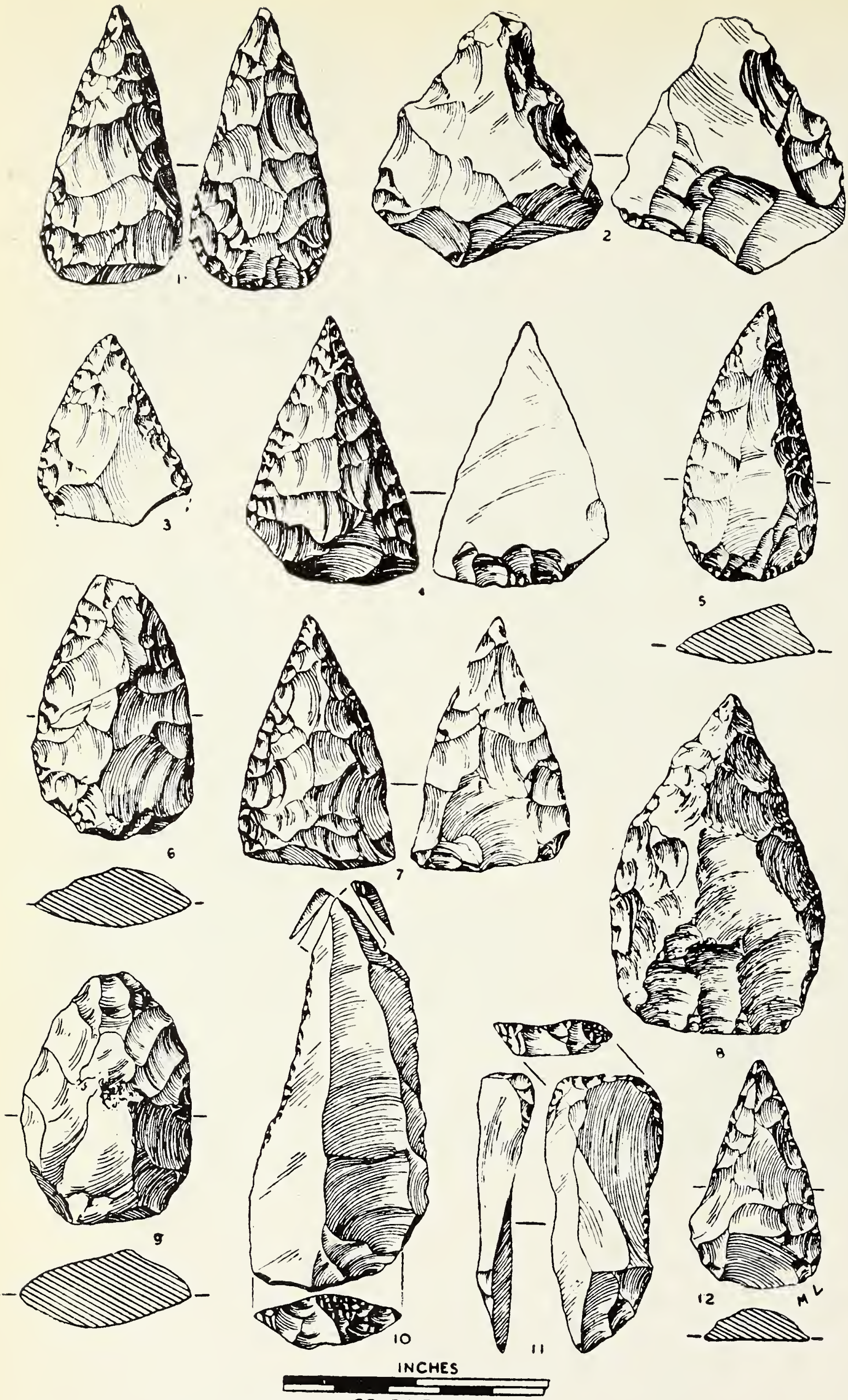


Fig. (2). *The Industries. Early Stillbay.*

Nos. 1, 3 and 4 Stillbay points from the 11-foot level. No. 2 tortoise core from the 12-foot level. Remainder from the 10-foot level. (Nos. 5—9 and 12 Stillbay points; No. 10 burin on flake with facetted striking platform; No. 11 end scraper.)

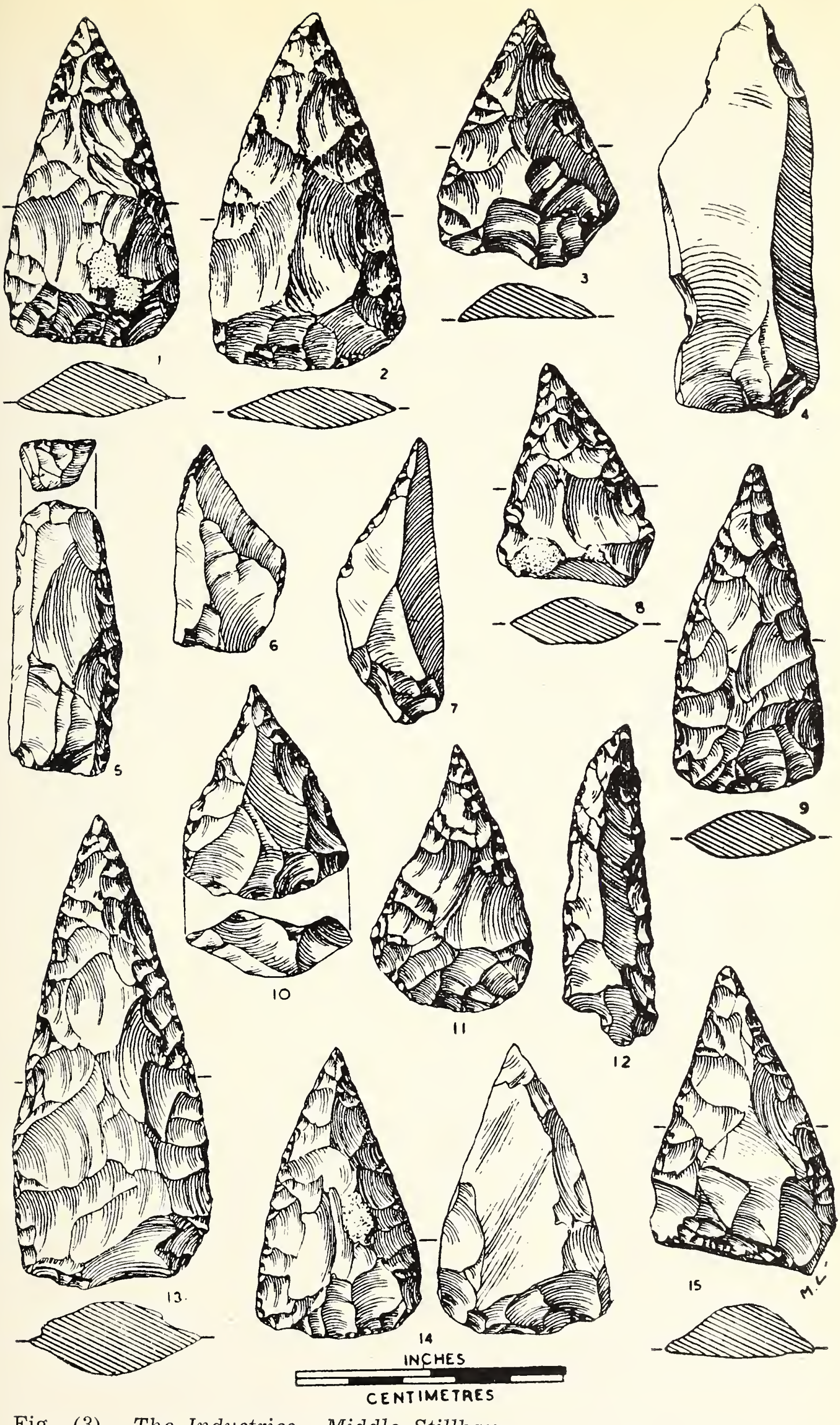


Fig. (3). *The Industries. Middle Stillbay.*
Nos. 1—6 from the 7-foot level. (Nos. 1, 2 and 3 Stillbay points; No. 4 backed blade; No. 5 end scraper; No. 6 obliquely-trimmed point.) Nos. 7—10 from the 8-foot level. (No. 7 obliquely-trimmed point; Nos. 8, 9 and 10 Stillbay points.) Nos. 11—15 from the 9-foot level. (No. 12 backed blade, remainder Stillbay points.)

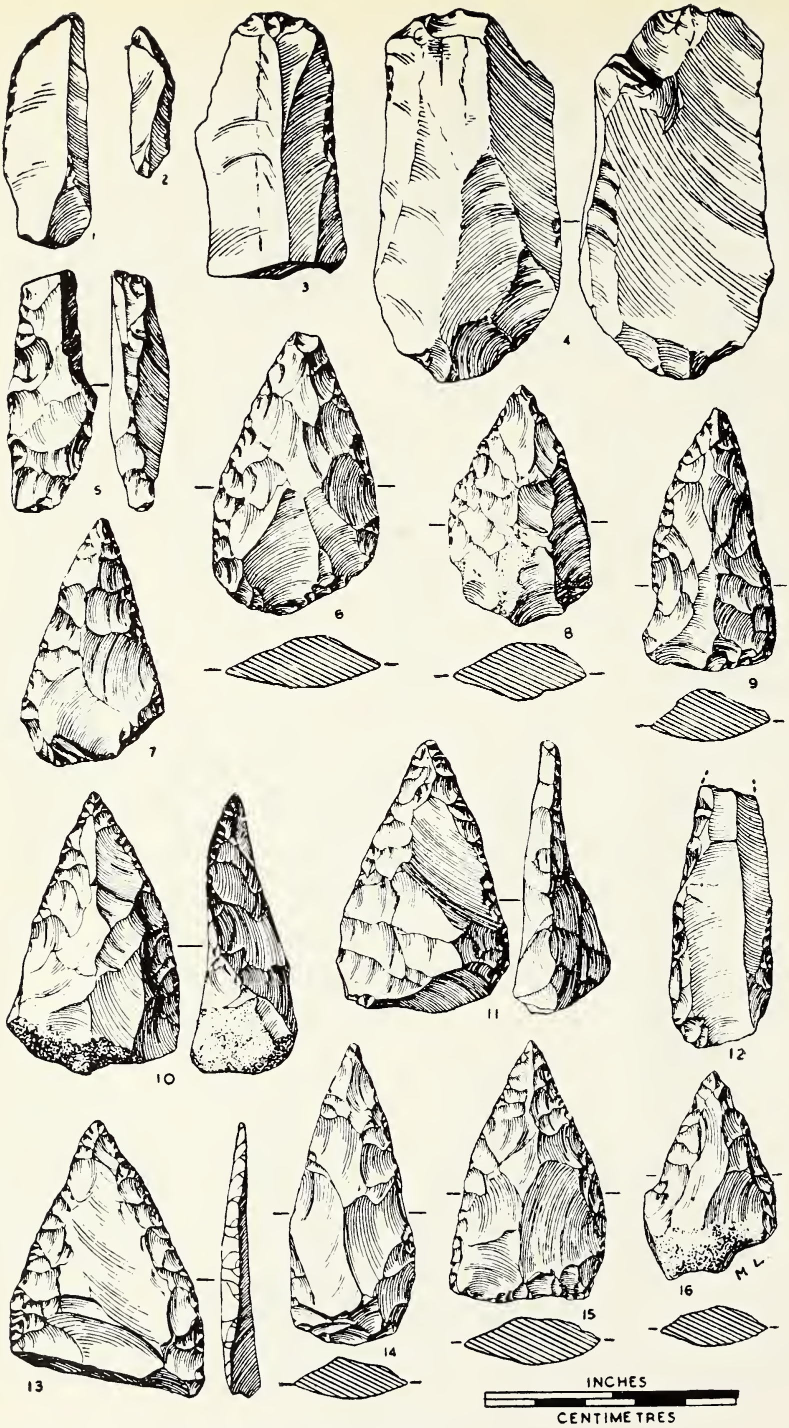
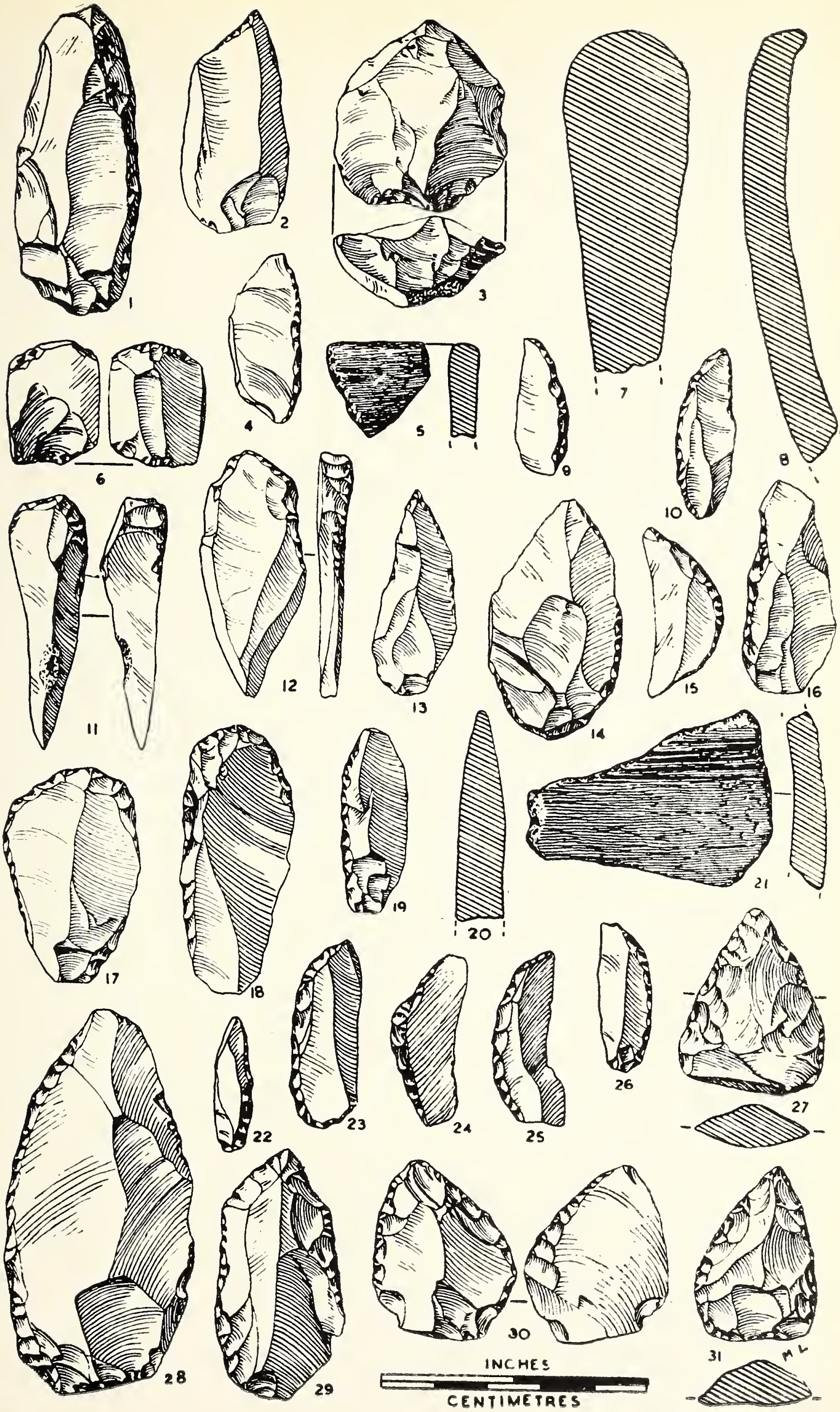


Fig. (4). *The Industries. Upper Stillbay.*
Nos. 1—6 and 10 from the 4-foot level. (Nos. 1 and 2 backed blades; No. 3 end scraper; Nos. 4 and 5 angle burins; Nos. 6 and 10 Stillbay points.) Nos. 7—11 Stillbay points from the 5-foot level. Nos. 12—16 from the 6-foot level. (No. 12 backed blade, remainder Stillbay points.)

PLATE 36.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CENTIMETRES
M L

Fig. (5). *The Industries. Magosian and Mesolithic or Neolithic.* *Mesolithic or Neolithic.* Nos. 1—5 from the 1-foot level. (Nos. 1 and 2 backed blades; No. 3 tortoise core; No. 4 lunate; No. 5 pottery rim fragment.) Nos. 6—16 from the 2-foot level. (No. 6 lame écaillée; Nos. 7 and 8 fragments of pot rims; Nos. 9 and 10 lunates; Nos. 11 and 12 end scrapers; Nos. 13, 14 and 16 backed blades; No. 15 lunate.

Magosian from the 3-foot level. Nos. 17 and 18 end scrapers; No. 19 backed blade; No. 20 section of pot rim; No. 21 decorated potsherd; Nos. 22—26 lunates; Nos. 27, 29, 30 and 31 Magosian points; No. 28 large backed blade.

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EXCAVATION OF A ROCK SHELTER AT GORGORA, LAKE TANA, ETHIOPIA.

By Colonel F. Moysey.

Gorgora is an ex-Italian military station situated on the northern shore of Lake Tana, 12° 15′ N. by 37° 20′ E.

The lake has obviously receded and on this northern shore there is a large area of flat land extending for many miles towards Gondar.

Out of this alluvial plain rise here and there conical-shaped hills of volcanic rock which once were islands in a larger lake. About three miles from the lake one of these hills rises abruptly from the surrounding plain to a height of 300 feet and has a rock shelter. The shelter is most inaccessible, being only approached from one direction and that after a steep climb of 150 feet.

From a small platform outside the shelter the ground drops steeply to another platform of soil and then by a precipice to the base of the hill. During the rainy season a stream runs at the base of the hill.

The excavation, which was carried out with the help of two Ethiopian soldiers, was not accomplished without minor difficulties, the chief of which were heavy rain and very angry bees who had their nests in the rock above the shelter.

Added interest was given to the work by the discovery of an unexploded bomb hidden in the trench at the 9 feet level, placed there by a local humourist who perhaps objected to our activities.

The shelter is 15 feet long with a maximum width of 8 feet between the rock walls. For purposes of reference, areas excavated were given capital letters and artefacts found in these areas were marked with the area letter and the depth in feet.

"A" was an exploratory trench 8 feet by 4 feet dug across the entrance to a depth of 3 feet.

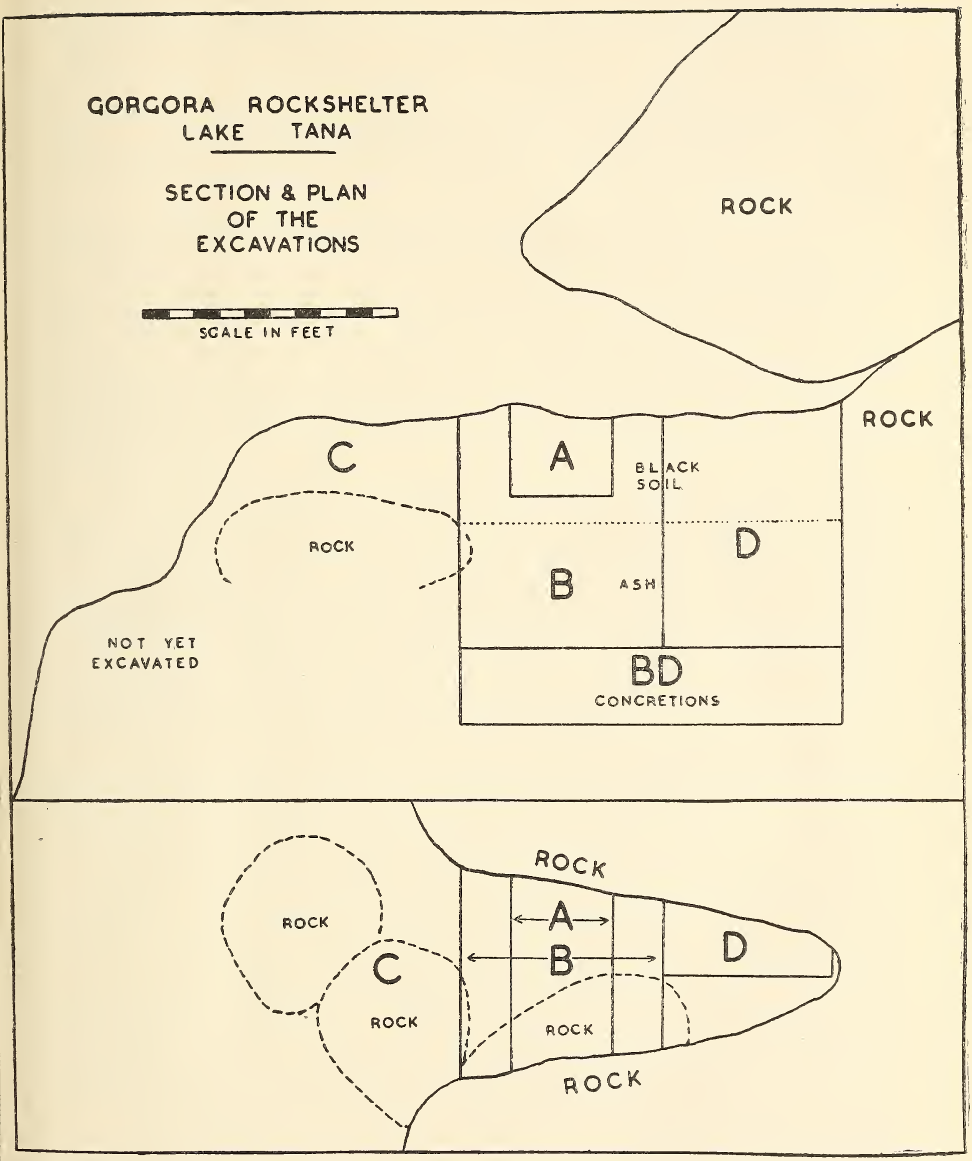
"B" was an area 8 feet by 4 feet which included area "A" and was excavated to a depth of 9 feet.

"C" was a small platform outside the shelter which proved to be only 3 feet deep before rock was encountered.

"D" the excavation of area "B" beyond 9 feet became impossible owing to the narrowing of the rock walls. An area from "B" to the back of the cave was, therefore, attacked. On reaching the 9 feet level both areas "B" and "D" were excavated together to a depth of 12 feet. At 12 feet the area "BD" was only 15 inches wide between the rock walls and further work was abandoned.

Actually there was no difference in the soil or in the implements found in each area.

Black soil rich in humus was found from the surface to a depth of 4 feet.


GORGORA ROCKSHELTER
LAKE TANA
SECTION & PLAN
OF THE
EXCAVATIONS
SCALE IN FEET
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CONCRETIONS
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ROCK
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ROCK
ROCK
ROCK

Fig. 1.

From the 4 feet level downwards the soil was a grey volcanic ash. At the 9 feet level concretions appeared and these increased until at the 12 feet level they occupied the whole trench.

Implements were found within 2 inches of the surface and continued throughout all levels. There were no sterile layers. Pottery was found to a depth of 4 feet.

The excavation is not quite complete, there is a small area within the shelter and a platform outside which I hope will provide further material for study at the Coryndon Museum, Nairobi.

It is not my purpose to discuss the results of the work or to describe the implements found, for this is in the able hands of Dr. Leakey.

THE INDUSTRIES OF THE GORGORA ROCK SHELTER, LAKE TANA.

By L. S. B. Leakey, M.A., Ph.D.,
Honorary Curator of the Coryndon Museum.

(PUBLISHED BY PERMISSION OF THE TRUSTEES.)

General Notes.

Colonel Moysey has asked the writer to describe the stone age material obtained by him from the Gorgora Rock Shelter.

The whole of the material — including waste flakes — was brought to Kenya and presented to the Coryndon Museum. The majority of the specimens are waste flakes or *débitage* and the fact that all these were made available for study together with the implements, facilitates a proper appreciation of the industries represented.

In his account of the excavations Colonel Moysey has pointed out that no sterile layers were encountered, indicating a more or less continuous occupation of the shelter by stone age man. Colonel Moysey has also noted that the top 4 feet of the deposit filling the shelter consisted of a black soil rich in humus, beneath which the deposit was mainly of grey volcanic ash down to the 8-foot level where concretions began to appear. These became increasingly common just above bed rock where almost the whole deposit was found to be cemented together.

The artefacts from the 12-foot level upwards to the top of the 4-foot level belong to the culture known as Stillbay. Throughout this series a gradual development is discernable, reaching a peak in the 7-foot level and followed by a distinct degeneration in the 6-foot and 5-foot levels.

On a Kenya basis, the lower levels would be classed as Early Stillbay, the middle levels as Middle Stillbay, and layers 6, 5 and 4 as Late Stillbay with layer 4 transitional to the Magosian. Layer 3, near the base of the black soil with humus, contains an industry which is attributable to the Magosian, a degenerative derivative of Stillbay, while the top 2 feet of the black soil contain a very crude microlithic industry which may best be regarded as a local derivative of the Magosian, comparable to the Wilton B of Kenya and Northern Tanganyika.

This industry, however, cannot be regarded as true Wilton, since it does not contain any of the characteristic Wilton forms. The number of specimens is too few to justify a final classification, but it is possible that this rough microlithic industry represents part of a Mesolithic or Neolithic assemblage from which some elements are missing.

The excavations, as Colonel Moysey has explained, were carried out by digging 1-foot depth of deposit at a time and the 4-foot level was, in fact, partly black soil, changing at its base to grey volcanic ash. This corresponds exactly with the typological evidence of the specimens, for layer 4 had already been classified as transitional from Stillbay to Magosian before Colonel Moysey's notes were received.

Details of the Industries from the Different Levels.

In discussing the industries from the different levels, the material will be dealt with in chronological sequence from the earliest to the latest and not in the order in which they were found.

Early Stillbay (Plate 33).

(From the 12-foot, 11-foot and 10-foot levels.) The 12-foot level yielded only eight specimens and of these, all but one are waste flakes. The exception is a small unstruck tortoise core showing a well-made, prepared striking platform. The 11-foot level yielded eighteen specimens of which twelve are waste flakes and six implements. Among these are four points of the Stillbay type, one of which is broken, and also two fragments of utilised flakes. Many of the waste flakes show facetted striking platforms indicating the use of the Levalloisian technique. From the 10-foot level, seventy-one specimens were obtained, thirty-four of which are waste flakes and thirty-seven implements and utilised flakes. Twenty-seven of the latter may be classified as Stillbay points and they approximate more closely to the Kenya Early Stillbay than to the Middle Stillbay. Nevertheless, certain specimens are as fully developed as in the Middle Stillbay and this level appears to be transitional between the two phases. In addition to the twenty-seven Stillbay points, there are the following: one burin, one crude end scraper, one small tortoise core and seven utilised flakes. The waste flakes include many specimens with facetted striking platforms.

Middle Stillbay (Plate 34).

(From the 9-foot, 8-foot and 7-foot levels.) The 9-foot level yielded a total of one hundred and thirty-four specimens, of which only ninety-six are waste flakes, the remaining thirty-eight being either implements or utilised flakes and cores. Of these, thirty are points of Stillbay type and the other eight comprise one small tortoise core, one core regenerator and six utilised flakes. The waste flakes again include many examples of facetted striking platforms. The 8-foot level yielded a total of one hundred and seventeen specimens of which eighty-five are waste flakes and thirty-two implements and utilised flakes. Twenty-five of

these are Stillbay points, the remaining seven specimens consist of one core regenerator and six utilised flakes. Fragments of red pigment occurred at this level. Many of the waste flakes show facetted striking platforms. The 7-foot level yielded one hundred and eleven specimens of which eighty are waste flakes and thirty-one implements or utilised flakes. Of these, twenty-three are Stillbay points and the remaining eight specimens comprise one scraper, three utilised flakes and four flakes exhibiting steep but crude secondary chipping on one lateral edge of the tip, suggesting rough obliquely trimmed points or backed blades. The waste flakes include a large number showing facetted striking platforms. Some fragments of blueish-grey colouring material were also found.

Upper Stillbay (Plate 35).

(From the 6-foot, 5-foot and 4-foot levels.) The 6-foot level yielded seventy-seven specimens of which sixty-seven are waste flakes. Ten of the implements are points of the Stillbay type, one is a large backed blade and two are core regenerators. Fragments of red pigment also occurred. Flakes with facetted striking platforms are again represented. The 5-foot level yielded two hundred and one specimens of which one hundred and seventy-nine are waste flakes, twenty are Stillbay type points and two are utilised flakes. Both red and grey-blue colouring materials were found in this level. The waste flakes include many with facetted striking platforms. The 4-foot level yielded one hundred and thirty-six specimens of which one hundred and eleven are waste flakes, many of which have not got facetted striking platforms. Of the twenty-five implements and utilised flakes, only five are Stillbay points and the other twenty specimens comprise two crude scrapers, four burin spalls, two burins, two core regenerators, two crude backed blades and eight utilised flakes. Red and grey-blue colouring material occurred in greater quantity than in the other levels.

The material from the 4-foot level is classed with the Upper Stillbay of the 5-foot and 6-foot levels, but it should more strictly be regarded as transitional to the Magosian of the 3-foot level. The few Stillbay points are less well made than those from the 5-foot and 6-foot levels, but they are more like the true Stillbay than the Magosian forms. One potsherd reported from this level was probably derived from the junction with the 3-foot Magosian level.

Magosian (Plate 36. Nos. 17—28).

(From the 3-foot level.) This level yielded two hundred and twelve specimens, of which one hundred and eighty are waste flakes. The remaining thirty-two specimens consist of the following: three hammerstones, seven Magosian type points (degenerate Stillbay), one *Audi* point, eleven small crudely

made backed blades and lunates, five scrapers, one burin spall and four utilised flakes. Comparatively few of the waste flakes show facetted striking platforms. The level also yielded eight potsherds, among which are one undecorated straight rim fragment and one sherd showing a decoration of five lightly incised parallel lines. These eight sherds are from a number of different pots and vary considerably in thickness. There are indications that the coil or ring method of manufacture was employed.

A Late Mesolithic or Neolithic Industry (Plate 36. Nos. 1—15).

(From the 2-foot and 1-foot levels.) The 2-foot level yielded one hundred and forty-seven specimens of which one hundred and twenty are waste flakes, the remaining twenty-seven specimens comprise the following: fourteen poorly made lunates and small backed blades, seven crude scrapers, one hammerstone, one core regenerator, one *lame écaillée* and three utilised flakes. There is not a single example of a facetted striking platform among the implements or waste flakes. Eleven potsherds were also recovered from this level, and they include a rim fragment of a large coarse pot, 22 mm. thick at the lip, together with a rim fragment of a thin pot, only 4 mm. thick. All are undecorated and there is no trace of the coil or ring technique.

The 1-foot level yielded eighty-eight specimens of which seventy-nine are waste flakes. The remaining nine specimens comprise the following: one hammerstone, two core regenerators, three backed blades and three utilised flakes. Facetted striking platforms do not occur among the waste flakes. Nine potsherds were recovered from this level, they are similar to those from the 2-foot level and none are decorated. There is one small rim fragment 6 mm. thick.

Conclusions.

The industries from the Gorgora Rock Shelter, from the lowest to the top levels are as follows: Early Stillbay developing into Middle Stillbay, Upper Stillbay and thence to Magosian. Thus far there appears to have been a continuous evolution of culture in the shelter, but the Magosian is followed by a degenerate microlithic culture which is probably a local Mesolithic or Neolithic derivative of the Magosian with certain elements missing in the material recovered.

FIND TABLE.

Culture.	Level.	Total.	Potsherds.	Backed Blades and Crescents.	Scrapers.	Hammerstones.	Lames Ecaillees.	Burins.	Burin Spalls.	Magosian Points.	Stillbay Points.	Tortoise Cores.	Blade Cores.	Core Regenerators.	Pigments.	Utilised Flakes.	Waste Flakes (Bulb Ends).	Waste Fragments.
Mesolithic or Neolithic.	1	88	9	3	—	1	—	—	—	—	—	—	—	2	—	3	60	19
	2	147	11	14	7	1	1	—	—	—	—	—	—	1	—	3	96	24
Magosian.	3	212	8	12	5	3	—	—	1	7	—	—	—	—	—	4	141	39
Upper Stillbay.	4	136	1	2	2	—	—	2	4	—	5	—	—	2	xx	8	94	17
	5	201	—	—	—	—	—	—	—	—	20	—	—	2	x	—	152	27
	6	77	—	1	—	—	—	—	—	—	7	—	—	2	x	—	54	13
Middle Stillbay.	7	111	—	4	1	—	—	—	—	—	23	—	—	—	x	3	69	11
	8	117	—	—	—	—	—	—	—	—	25	—	—	1	—	6	69	16
	9	134	—	—	—	—	—	—	—	—	30	1	—	1	x	6	86	10
Lower Stillbay.	10	71	—	—	1	—	—	1	—	—	27	1	—	—	x	7	27	7
	11	18	—	—	—	—	—	—	—	—	4	—	—	—	—	2	11	1
	12	8	—	—	—	—	—	—	—	—	—	1	—	—	—	—	6	1
Totals:		1,320	19	36	16	5	1	3	5	7	141	3	0	11	—	42	865	185

SOME COMMON BUTTERFLIES OF THE NAIROBI DISTRICT.

By A. J. Wiley and J. R. Hudson,

Kabete.

Introduction.

The lack of any handy review dealing with the butterflies of the Nairobi district has been keenly felt for many years. A study of butterflies during childhood has been to many their first introduction to the wonders of nature, and the attention paid by children to the cases of butterflies in the Coryndon Memorial Museum, gives ground for the belief that Nairobi children do not differ from those of other countries in their interest in these insects. It is hoped that these notes which are not intended to be an addition to the scientific knowledge of the butterfly fauna of Nairobi, will serve as an introduction to the subject for beginners.

The present article is based mainly on observations on the butterflies of Karura forest, of Kabete, and of Ruiru, made during the last two years. In determining their specimens, the authors have consulted the very valuable series of articles by Dr. V. G. L. van Someren and his collaborators, which have appeared in the *Journal* of the Society. Determinations would have been more simple, had this series been completed. We have also obtained most of our information on food-plants from these papers or from the exhibit which Dr. van Someren prepared for the Coryndon Museum. The "skippers" have been identified from Evans (1937) and revisions of the genera *Colotis* and *Terias* by Talbot (1939) and Corbett (1934) have been followed. For the rest we have had to rely almost entirely on Aurivillius (1908-1925). Notes at the end of the article explain a few other changes in nomenclature which we have made. It is hoped that, even if some of the names require revision in the light of modern knowledge, they will serve as a basis of classification for those who have no alternative source of information.

Unfortunately, the majority of our local species have no common, English names and, although the authors had thought of inventing some, on second thoughts they decided not to do so. To remember the scientific names requires little extra effort and in the end these names are of much greater use.

Some difficulty has been experienced in the choice of the species to be included. For the most part we have selected the species that in our experience have been encountered most

frequently. One or two less common species, however, have been described because they are either mimics of, or models for, species that are often collected.

Coloration of Butterflies.

No account of East African butterflies would be complete without some brief notes on coloration. The species described in this article include forms which illustrate cryptic and warning coloration, mimicry, and sexual and seasonal dimorphism. In fact, were all the known species of butterflies available from which to choose, it would be hard to find better examples to illustrate these subjects, some knowledge of which will add interest to the outdoor study of our local forms.

Cryptic and Warning Coloration.

Animals, in general, may be divided into those which are cryptically coloured, so that, at least when at rest, they are concealed from their enemies and those which advertise their presence by brilliant or contrasting colours. As a beautiful example of the former, the butterfly *Precis tugela* Trim. may be cited. When at rest on a twig this butterfly can easily be mistaken even by an experienced observer for a dead leaf. One of the classical examples of the latter is a wasp. The black and yellow warning colour of a wasp is readily recognised by predatory animals, who soon learn to associate it with a sting.

Insects with cryptic coloration usually have habits suited to their disguise. There would, for example, be no point in an insect looking like a dead leaf if it got up and flew away as soon as an enemy approached. The majority of insects with warning colours are unpleasant to the taste and are, therefore, left severely alone by insectivorous animals. They are bold in their habits, knowing full well that there is very little risk of their being attacked. Some insects with warning colours are, however, edible. They have frequently developed warning colours because such colours have caused them to be mistaken for other insects which are best left alone by predators. Such edible insects are usually described as mimics although the choice of this word is unfortunate since mimicry, in its usual sense, implies a voluntary effort to copy.

Mimicry.

As a general rule an insectivorous animal can only discover that a certain combination of colours goes with inedibility by experience, and it therefore follows that the model is usually a common species. It is obvious, too, that it is to the advantage of inedible species to have the same combination of colours, since their enemies learn all the more rapidly to leave them alone. There are, in consequence, two forms of mimicry, Batesian mimicry in which the mimic is edible and harmless and Mullerian mimicry in which the mimic is distasteful.

On Plate 38, there are illustrated the common, inedible species *Danaus chrysippus dorippus* with its Batesian mimic the female form *Hypolimnas misippus inaria,* and a Mullerian mimic, *Acraea encedon daira.* The typical form *Danaus chrysippus chrysippus* has as mimics the typical female form of *Hypolimnas misippus* and the form *Acraea encedon lycoides.* It will be seen from the Plate that the beautiful male *Hypolimnas misippus* is not a mimic. When disporting itself on flowers this is a most conspicuous insect; but numerous specimens, in a coconut plantation near Mombasa, were observed to settle almost exclusively on charred patches of grass and ashes, where coconut husks had been burned. In such a situation the coloration of the underside was definitely concealing.

One of the finest examples of mimicry occurs in the females of the swallowtail butterfly, *Papilio dardanus.* The male, as will be seen from Plate 42, is a typical swallowtail; but the local females have no tails. Several forms of female are known, each a mimic of an unpalatable species of the family, *Danaidae.* In the Nairobi area the females are very variable; but show a general resemblance to the forms *cenea* or *hippocoon.* These female butterflies are Mullerian mimics, and the local variability is attributed by some authorities to the scarcity of models in the area. Another good example of mimicry is illustrated on Plate 41 where the rather rare *Papilio rex* and the more common *Danaus formosa* are shown.

Sexual Dimorphism.

When an insect occurs in two, more or less dissimilar forms the phenomenon is called "dimorphism." Several butterflies in which the sexes are quite different have already been mentioned and many others will be detected from an examination of the Plates.

Seasonal Dimorphism.

Probably the best known example of seasonal dimorphism is the butterfly, *Precis octavia.* The dry-season form, *Precis octavia sesamus* is a blue insect with a row of red spots near the outer edge of each wing and other, black, markings. The wet-season form, however, is brick red with black markings. Intermediate forms occur, as, for example, that illustrated in Plate 40, Fig. 9. The dry-season form is often a larger, and more soberly-coloured insect than the wet-season form, the great size of the dry-season form being due, in all probability, to the fact that it develops from a larva which feeds during the wet season when food is more plentiful. Less-marked instances of seasonal dimorphism are common among the family, *Pieridae.*

Classification.

It is unusual in an article of this type to deal with classification from the scientific viewpoint. Owing, however, to the existence of mimicry amongst our local species, some notes on classification are really essential if the reader is to be able to satisfy himself on the identity of some of the mimetic forms. Reference to Plate 38 will show the very close similarity in general appearance between *Danaus chrysippus dorippus* and *Hypolimnas misippus inaria.* These two butterflies belong to the different families, *Danaidae* and *Nymphalidae* and from the wing diagrams on Plate 37 it will be seen that the cells of the wings in the *Danaidae* are closed, whereas those of the *Nymphalidae* are open. With this knowledge one is able to decide quite easily which species is under examination.

Butterflies are insects belonging to the order *LEPIDOPTERA.* The order is so called because the wings are covered with minute scales. If the insects are carelessly handled, these scales are easily detached, when they appear as a fine dust on the fingers, and it is they which are responsible for the marvellous colours on the wings. The *LEPIDOPTERA* are divided into a number of families, one group of which is usually referred to as "butterflies," the remainder of them being "moths." The group is, however, not a natural one and hence the differences between butterflies and moths are not clearly defined. The following characters will usually enable one to decide if an insect is a butterfly or a moth:—

> Butterflies fly by day; antennae (feelers) clubbed at the tip; when at rest wings held vertically with the upper surfaces touching over the back. The "skippers" have the antennal clubs tapering gradually at each end and some of them rest with the wings flat to show the upper surface.
>
> Moths, the majority fly by night; antennae usually threadlike or feathered; rest with wings folded horizontally over the back so that the upper surface of the forewings is exposed. A few bright-coloured moths fly by day and, of these, some, e.g., the "burnets," have antennal clubs resembling those of the "skippers." Some of the geometer moths rest with wings erect.

In East Africa, there are ten families the members of which are usually called butterflies. The main characters of the families are as follows:—

The first four families are treated by some authors as subfamilies of one family, *Nymphalidae.* They agree in having the front legs of both sexes reduced and useless for walking (Plate 37. Fig. 1). The chrysalis hangs by the tail.

Family *DANAIDAE.*

Cells of both wings closed, anal nervures of forewings forked at the base. Male with unjointed, female with jointed fore-tarsi; no claws on forelegs of either sex. Larvae smooth with fleshy protuberances.

Family *ACRAEIDAE.*

Narrow - winged butterflies, usually predominately brown or reddish brown, cells of both wings closed. Inner edge of hindwings without groove to enclose abdomen. Larvae with long branching hairs.

Family *NYMPHALIDAE.*

Cells of hindwings open or rarely closed by a very fine transverse vein; inner edge of hindwing with a groove to enclose abdomen. Larvae spiny or smooth.

Family *SATYRIDAE.*

Cells of both wings closed, subcostal nervure thickened near base. Fore-tarsi of male unjointed and long-haired; of female with short joints and less hairy. Palpi flattened, with long bristly hairs. Larvae with forked tail-segment, smooth or clothed with short hairs.

Family *RIODINIDAE.*

A small family, most of the members of which are found in tropical South America. The forelegs of the males are reduced and useless for walking; but in the female all six legs are perfect although the front pair may be rather smaller than the others. The wing neuration resembles that of the *Lycaenidae.* There are no species described in this article.

Family *LIBYTHEIDAE.*

Another small family of which no representative is included in this article. The family is characterised by having palpi almost four times as long as the head and projecting forwards like a snout.

Family *PAPILIONIDAE.*

All legs well-developed in both sexes, claws large but not toothed. Inner margin of hindwing concave and distinguished from all other families by having only one anal nervure which is paralled to the edge of the wing; wings often tailed. Larvae cylindrical, never hairy; but sometimes with fleshy knobs and a retractile horn behind the head. Pupae standing on the tail and held up by a silken girdle; two frontal tubercles.

Family *PIERIDAE.*

All legs well-developed in both sexes, claws bifid or toothed, venation similar to that of *Papilionidae;* but two anal nervures present in hindwings. Larvae cylindrical and hairy. Pupae as in *Papilionidae* but only one, central, frontal tubercle.

Family *LYCAENIDAE.*

Forelegs almost as large as the other two pairs, forefeet in the male usually unjointed and terminating in a simple hook, in the female jointed and having two claws: neuration as in the *Hesperiidae;* but only three or four radial nervures present, antennae inserted close together. Larvae strongly convex above and flat below, short and hairy. Pupae standing on the tail and held up by a silken girdle.

Family *HESPERIIDAE.*

All six legs well-developed, claws short and stout. Forewings with five equally-spaced radial nervures. Head broad, antennae widely separated at the base and eyes prominent: body relatively stout for size. Larvae with a large head and narrow thoracic segments. Pupae in a slight, silken cocoon.

The important distinguishing features are illustrated in Plate 37 and it is hoped that with the help of these figures the reader will have no difficulty in deciding to what family a butterfly belongs whether it be described in this article or not.

Description of Species.

Family *DANAIDAE.*

Genus *Danaus* Klug.[1]

Danaus chrysippus (Linn)

The "golden danaid." General colour browny-orange with black margins to the wings and white and black spots. Four different forms occur. The typical form, *D. chrysippus chrysippus* (Linn) (Plate 38, Fig. 1), has the whole of the apical portion of the forewing black with a series of white spots forming a bar across the tip. The form, *D. chrysippus dorippus* Klug. (Plate 38, Fig. 2), has only the margin black and is without the white bar of the typical form. A form similar to *dorippus,* but with a white centre to the hindwing is sometimes encountered. This is *D. chrysippus albinus* Lanz. (Plate 38, Fig. 3). The fourth form, which is not illustrated, is *D. chrysippus alcippus* (Cr.). This is similar to the typical form; but like *albinus* has white centres to the hindwings. The sexes are similar except that the males have four black spots on the hindwing instead of three as in the female. The extra spot is a sex pouch.

By far the commonest form is undoubtedly *dorippus;* but, at Ruiru for instance, all the above forms have been collected. The species is on the wing throughout the year and is frequently seen in most types of country with the exception of forest. The flight is slow. The larvae feed on species of *Asclepias* and on *Gomphocarpus fructicosus.*

Danaus (*Melinda*) *formosa* (Godm.) (Plate 41, Fig. 5).

Has the inner portion of the wings rufous and the outer chocolate-brown. The spots are a pale cream. The sexes are very similar, but as in the last species the male can be distinguished by the sex pouch on the hindwing.

This species is most frequently found in forests. The flight, unless the insect is alarmed, is slow. The food-plant of the larvae is *Secamone platystigma.*

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[1] See Notes on Nomenclature, page 228.

Genus *Amauris* Hbn.

Amauris albimaculata (Butler) (Plate 42, Fig. 6)

Is a black and white butterfly with a buff-coloured rectangular patch on the hindwing. The sexes are similar.

This is a forest insect, not common in the Nairobi District and included to illustrate the principle of mimicry. It is the model for *Papilio dardanus* ♀-form *cenea* Stoll. (Plate 42, Fig. 2) as well as for females of *Papilio jacksoni* Sharpe and *P. echerioides* Trim. The larvae are found on *Cynanchum* sp.

Amauris niavius dominicanus (Trim.) (Plate 42, Fig. 7)

Is black and white, although when floating slowly along a forest track the wings appear to have a bluish sheen. It is a forest species which we have not collected near Nairobi and like the last is included since it is the model for a ♀-form of *Papilio dardanus* in this case, form *hippocoon* Fab. (Plate 42, Fig. 3). The food-plants are members of the asclepiad genera *Tylophora* and *Cynanchum*.

Family *ACRAEIDAE*.

Genus *Acraea* Fab.

Acraea bonasia (Fab.) (Plate 38, Fig. 11)

Has an orange-red ground colour and black markings. The sexes are very similar; but the female is slightly larger, a little less bright in colour and has a series of orange spots along the posterior margins of the hindwings.

At some seasons this species is very common in gardens and along forest paths. The larvae feed on a species of *Hibiscus*.

Acraea cabira (Hoppfer) (Plate 38, Fig. 10)

Is black and yellow. As in the last species the females can be distinguished by their larger size and by the presence of pale spots along the margins of the hindwings.

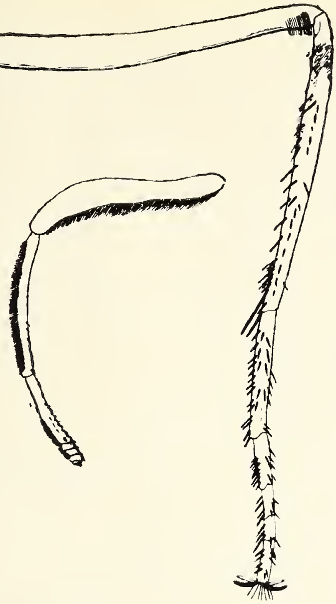
This species is common at some seasons and the larvae occur on a species of *Hibiscus*.

Acraea insignis (Distant) (Plate 38, Fig. 12)

Has the front half of the forewings transparent. The dark patch in the centre of the forewings and the margins of the hindwings are an intense black and, in fresh specimens the rest of the wings is a bright, brick red. In some examples the black central patch on the hindwings will be found to be broken up into a number of fairly large spots.

This species is found in forest and open park country and in some years is one of the commonest species in gardens around Nairobi. The caterpillars can be a serious garden pest stripping the leaves off grenadilla vines. They will also feed on a number of other garden plants.

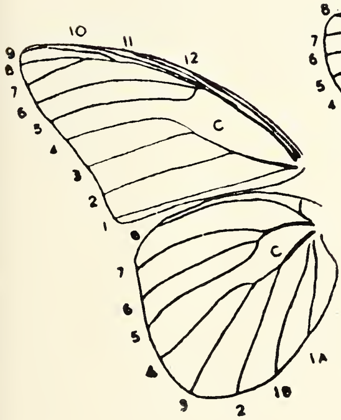
PLATE 37.—STRUCTURAL DIAGRAMS.



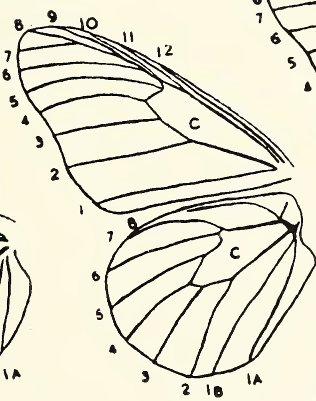
1.

2.

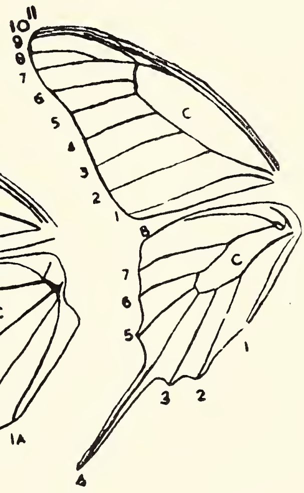
3.



4.



5.



6.

Fig. 1. Foreleg (on left) and midleg (on right) of *Hypolimnas misippus* ♀ drawn to the same scale to show the greatly-reduced foreleg in the *Nymphalidae*.

Fig. 2 & 3. Single claw of *Papilio nireus* ♂ (*Papilionidae*) and bifid claw of *Colotis antevippe* ♀ (*Pieridae*). Not to scale

Fig. 4—6. Diagrams of wing venation. The numbers are those used in referring to the veins. The discoidal cells are marked "C." Fig. 4. *Hypolimnas misippus* ♀ to show the open discoidal cell of the *Nymphalidae*. Fig. 5. *Danaus chrysippus* ♂ to show the closed cell of the *Danaidae*. Fig. 6. *Papilio porthaon* Hew. to show the single anal vein (vein 1) of the *Papilionidae*.

1. *Danaus chrysippus chrysippus* (L.) 2. *Danaus chrysippus dorippus* Klug. 3. *Danaus chrysippus albinus* Lanz.
4. *Hypolimnas misippus* ♀-f. *misippus* (L.). 5. *Hypolimnas misippus* ♀-f. *inaria* Cram. 6. *Hypolimnas misippus* (L.) ♂.
7. *Acraea encedon lycoides* Le Doux. 8. *Acraea encedon daira* G. & .S. 9. *Acraea terpsichore* (L.).
10. *Acraea cabira* Hopff. 11. *Acraea bonasia* (Fab.). 12. *Acraea insignis* Dist.

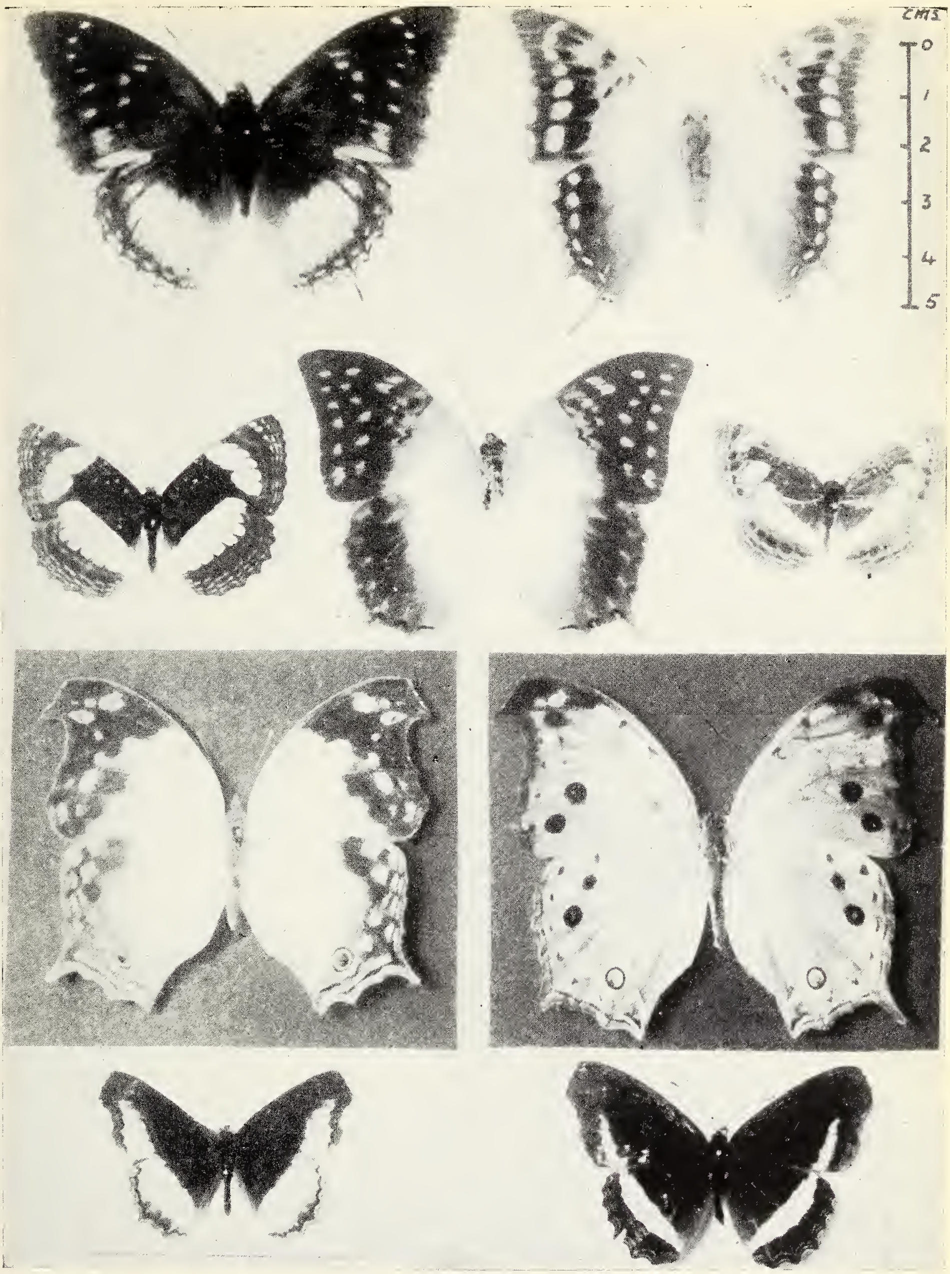
PLATE 39.

1 2

3 5

6 7

8 9



1. *Charaxes cithaeron* Feld.
2. *Charaxes candiope* (Godt.).
3. *Neptis agatha* Stoll.
5. *Neptis saclava* Boisd.
4. *Charaxes varanes vologeses* Mab.
6. *Salamis anacardii nebulosa* Trim.
7. *Salamis parhassus aethiops* Pal.
8. *Eurytela dryope* Cram.
9. *Eurytela hiarbas* Drury.

PLATE 40.

1. *Precis tugela* Trim. 2. *Precis terea elgiva* Hew. 3. *Precis oenone* cebrene Trim. 4. *Precis clelia* Cram.
8. *Precis octavia natalensis* Stgr. 9. *Precis octavia* intermediate. 10. *Precis octavia sesamus* Trim.

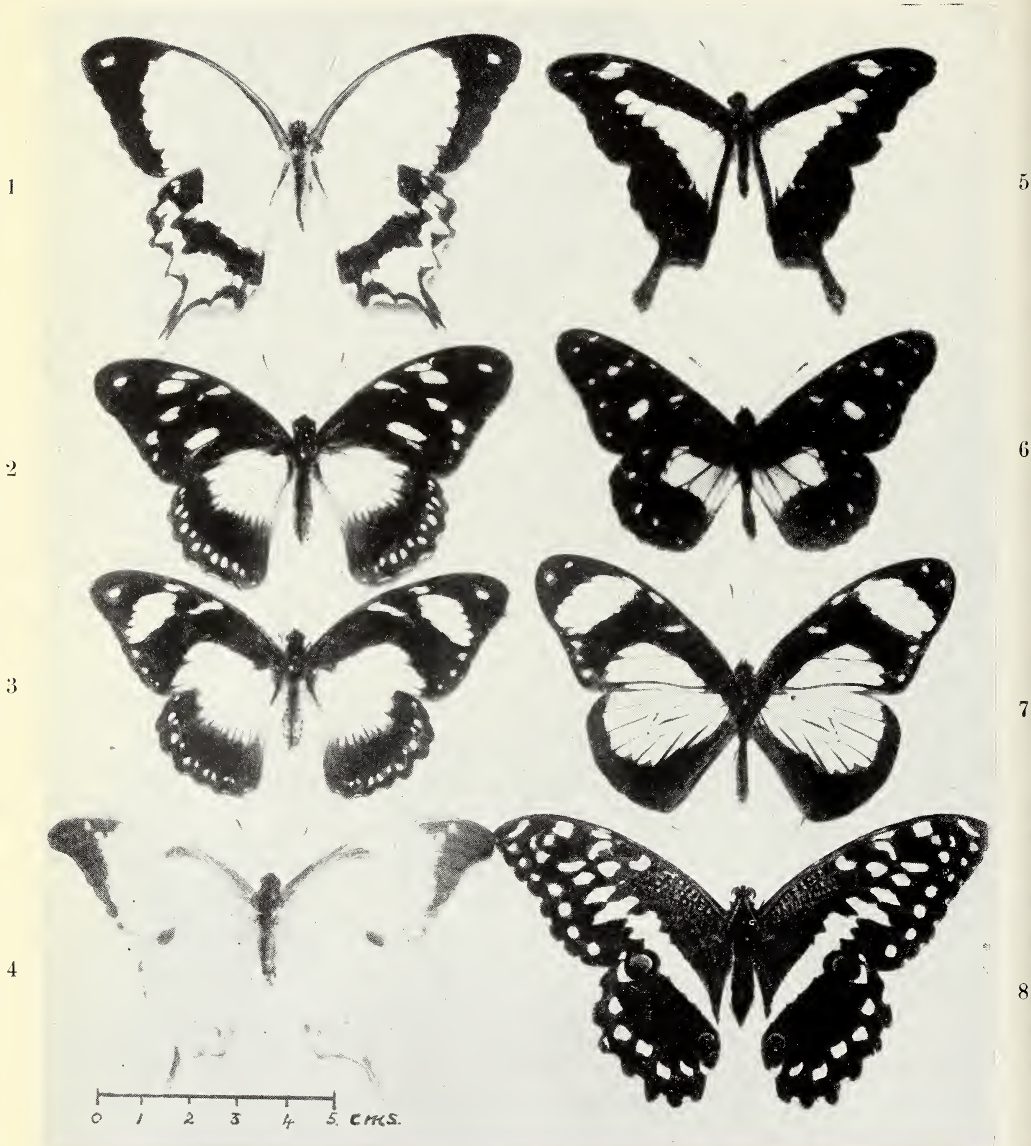
PLATE 41.

1. 2. 3.

4 5 6 8 7

1. *Papilio nireus lyaeus* Dbl. ♀ underside. 2. The same, ♂ upperside.
3. The same, ♂ underside.
4. *Papilio rex* Oberth.
5. *Danaus (Melinda) formosa* (Godm.).
6. *Mycalesis safitza* Hew. 7. *Neocoenyra gregorii* Butl.
8. *Melanitis leda* (L.).

PLATE 42.

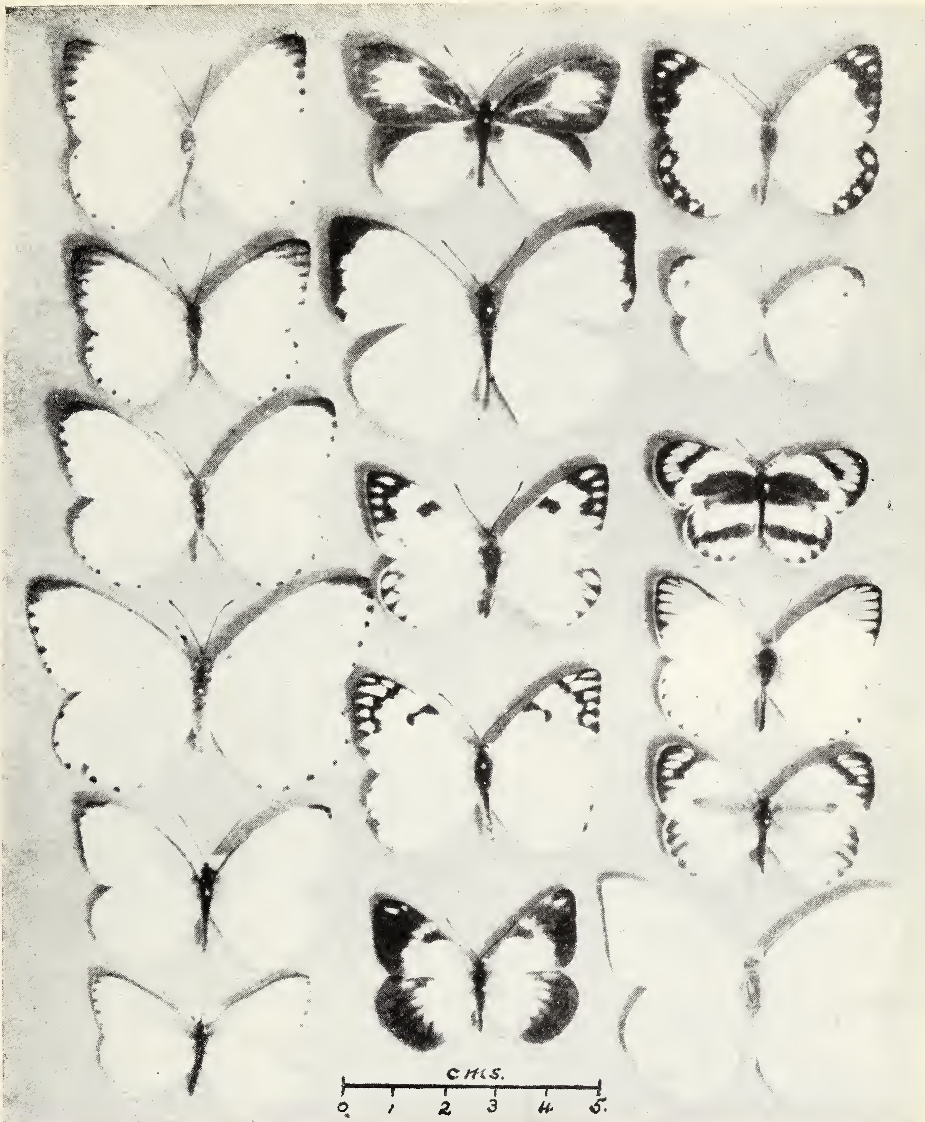


1. *Papilio dardanus tibullus* Kirby ♂.
2. *Papilio dardanus* ♀-f. *cenea* Stoll.
3. *Papilio dardanus* ♀-f. *hippocoon* Fab.
4. *Papilio nobilis* Rog.
5. *Papilio phorcas ansorgei* Rothsch.
6. *Amauris albimaculata* (Butl.).
7. *Amauris niavius dominicanus* (Trim.)
8. *Papilio demodocus* Esp.

PLATE 43.

7.

1.
2.
3.
4.
5.
6.



12.
13.
14.
15.
16.
17.

1. *Phrissura sabina phoebe* Butl. ♂.
2. *Phrissura sabina phoebe* Butl. ♀.
3. *Mylothris agathina* Cram. ♂.
4. *Mylothris agathina* Cram. ♀.
5. *Mylothris rupelli* Koch.
6. *Mylothris rubricosta* Mab.
7. *Mylothris sagala jacksoni* E. Sharpe.
8. *Eronia thalassina* Bsdv.
9. *Syncloë helice johnstoni* Crowl.
10. *Glycestha zochalia* (Bsdv.).
11. *Glycestha severina* (Cram.) ♀.
12. *Glycestha severina* (Cram.) ♂.
13. *Leptosia alceste* (Cram.).
14. *Colotis evippe omphale* (Godt.).
15. *Colotis antevippe zera* (Lucas) ♂.
16. *Colotis antevippe zera* (Lucas) ♀.
17. *Catopsilia florella* (Fab.) ♂.

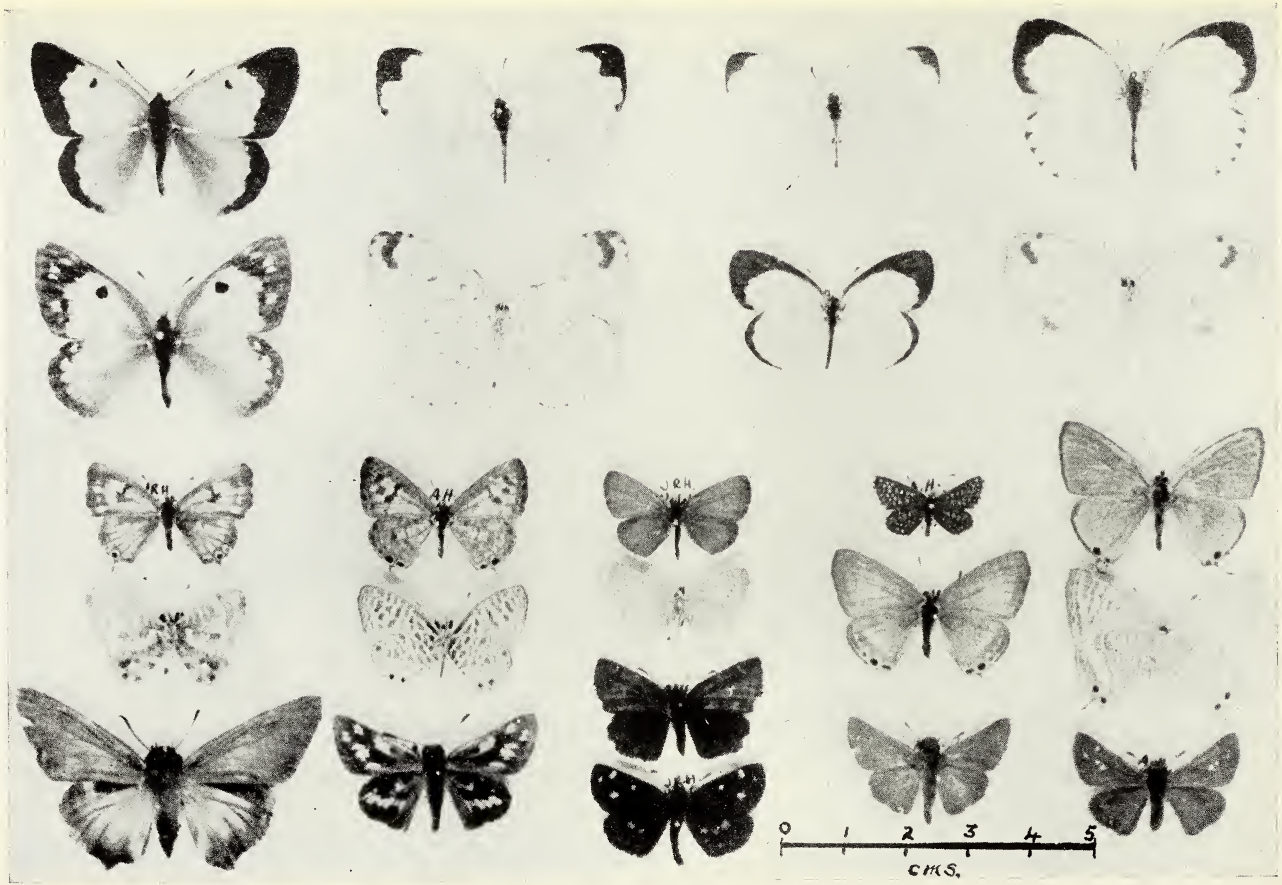
PLATE 44.

1. 2. 3. 4.

5. 8.

9. 13.

14. 18.



19. 20. 22 23. 24.

1. *Colias electra* (L). ♂ 2. *Terias hecabe maculata* Auriv. 3. *Terias hapale* Mab. 4. *Terias desjardinsi marshalli* Butl.
5. *Colias electra* (L). ♀ 6. *Terias hecabe maculata* ♀ underside. 7. *Terias brigitta zoe* Hoppf. ♂ 8. *Terias d. marshalli* ♀ underside.
9. *Cacyreus lingeus* (Cram). 10. *Syntarucus telicanus* (Lang). 11. *Cupido gaika* Trim. 12. *Cupido stellata* Trim. 13. *Cosmolyce boeticus* (L). ♂
14. *C. lingeus* underside. 15. *S. telicanus* underside. 16. *C. gaika* Trim underside. 17. *C. boeticus* ♀ 18. *C. boeticus* ♂ underside.

Acraea terpsichore (Linn) (Plate 38, Fig. 9)

Has the ground colour brownish-orange and the markings a brownish-black. The markings in this species are very variable, particularly in the females; but specimens are almost certainly this species if they resemble the illustration generally and have a small, black, rod-shaped marking amongst the dots in the centre of the hindwing. This rod is usually a deeper black than the surrounding dots. The sexes can be distinguished by the greater size of the females and the more sharply-defined markings of the males.

This is a common and widely distributed species. The larvae feed on species of *Triumfetta.*

Acraea encedon (Linn)

Has a large number of forms only the two which we have collected in the Nairobi district being illustrated. *A. encedon lycoides* le Doux (Plate 38, Fig. 7) is a mimic of the typical form of *Danaus chrysippus*. The general ground colour is yellow-brown: there are brownish-black markings and a white band across the tips of the forewings. *A. encedon daira* G. & S. (Plate 38, Fig. 8) is orange-brown with black markings and is a mimic of *D. chrysippus dorippus*.

Although perhaps not so common as the four preceding species of this genus, this butterfly is fairly frequent in the Nairobi district. The larvae feed on *Commelina* spp.

Family *NYMPHALIDAE.*

Genus *Charaxes* Oberth.

Charaxes candiope (Godt.) (Plate 39, Fig. 2)

Is a very beautiful butterfly. The basal half of the forewing is yellow with green veins and the outer half orange with very deep sepia-brown markings. The hindwing has a small yellow-green area near the base: the outer half is more chocolate than on the forewing and the markings are again a very deep brown. The female can be distinguished by its larger size and by the fact that the tails are more nearly equal in length. The different lengths of the tails in the male can be seen in the figure.

In the Nairobi district, this is one of the commonest species of the fine genus *Charaxes*. All the species are very strong fliers and are best captured on bait. They are attracted by the gummy exudations of certain trees, by fermenting fruit juices, and by the dung of carnivorous mammals, some baits proving more attractive for males, others for females. *Charaxes candiope* larvae feed on the leaves of *Croton* trees.

Charaxes cithaeron Feld.

The male (Plate 39, Fig. 1) is black with the spots on the fore- and hindwings blue. The large patch on the hindwing is white with a slightly bluish tinge. The first two spots near the apex of the forewing are also white. The female is black with an arc of almost contiguous, white spots on the forewing, the arc being continued as a broad, white band on the hindwing. The white is tinged in places with pale violet or buff.

This species is common in Karura forest. According to Dr. V. G. L. van Someren, the larvae feed on no less than five species of trees. Of these *Craibia elliottii* Dunn. and *Chaetacme microcarpa* Rendle are found in Karura.

Charaxes varanes vologeses Mab. (Plate 39, Fig. 4)

Has the basal half of both wings white with a suspicion of a bluish tinge. The outer half is orange with the darker portions orange-brown and with orange spots. The sexes are similar.

Whilst this species of *Charaxes* occurs in forest areas it is seen frequently in open savannah country also. It is easier to net in the absence of bait than the majority of the other species of the genus. At Ruiru, it may be observed visiting mango flowers. The food-plants are species of *Allophyllus*.

Genus *Neptis* Fab.

This is a small genus of forest butterflies with a characteristic hovering flight.

Neptis saclava marpessa Hpffr. (Plate 39, Fig. 5)

Is a small species. In colour it is a very dark brown, almost black, with white spots. At certain times it is a very common species in the forests of the Nairobi district.

Neptis agatha Stoll. (Plate 39, Fig. 3)

Is somewhat larger than the last species. The ground colour is similar; but the white markings are arranged differently. The ground colour of the underside is a paler brown than that of the upper surface.

This species is common in forests; but is also found in more open types of country.

Genus *Lachnoptera* Dbl.

Lachnoptera ayresi Trim. (Plate 40, Fig. 7)

Has the upper surface orange-brown with black markings. The under surface is grey-brown with a faint, bluish sheen. Near the posterior angle of the forewing there is a black, rectangular spot. The insect illustrated is a male, the female is very similar, but has the markings on the upper surface less sharply defined.

This species is often numerous in forests such as Karura. The food-plant of the larvae is *Rawsonia usambarensis* K. Schum.

Genus *Atella* Dbl.

This genus is closely related to the last.

Atella columbina Cr. (Plate 40, Fig. 5)

Is orange-brown with black markings above. On the underside the ground colour varies from yellow to a pinky-brown. Near the posterior angle of the forewing there are two round black spots, that nearer the angle being the larger. On the hindwing is a row of orange-brown spots of varying size and both wings show other, smaller, brown markings somewhat analogous to those of the upper surface.

There is another species of the genus which is much less common and which we have not collected. This species *Atella phalantha aethiopica* Rothsch. and Jord. is very similar in appearance to *A. columbina*. The latter is distinguished by the angle on the margin of the hindwing at vein 4, and by other fine characters.

Atella columbina is a common species throughout the Nairobi district.

Genus *Eurytela* Bdv.

Eurytela dryope Cr. (Plate 39, Fig. 8)

Is dark brown with an orange band beginning near the apex of the forewing and increasing in width as it passes across the wings to a maximum near the middle of the hindwing. Thereafter it narrows somewhat to its end on the inner margin of that wing.

Although it never seems to appear in great numbers this species is very widely distributed in Kenya.

Eurytela hiarbas Drury (Plate 39, Fig. 9)

Is very dark brown with a white band, similar to but narrower than the orange band in the last species.

This species occurs in bush and forest country. The larvae feed on a species of *Tragia*.

Genus *Hypolimnas* Hbn.

Hypolimnas misippus (Linn)

Is one of the best known examples of sexual dimorphism. The male (Plate 38, Fig. 6) has the upper surface black with white spots. Close examination will reveal a faint, purple sheen. The females occur in forms which are Batesian mimics of the forms of *Danaus chrysippus*. The type form *Hypolimnas misippus* ♀-form *misippus* (Plate 38, Fig. 4) is a mimic of the typical *Danaus chrysippus* whilst *H. misippus inaria* Cr. (Plate 38, Fig. 5)

is a mimic of *D. chrysippus dorippus*. In addition, there is a form which we have taken at the coast, and which resembles *D. chrysippus alcippus*. Like their models the females are orange-brown with black markings and in the case of *H. misippus misippus* there is, of course, a white bar across the apex of the forewing.

Whilst there is little resemblance between the male and the female forms of this butterfly on the upper side, on the underside the sexes are not unlike except for the presence of a broad white transverse band on the hindwing of the male. In differentiating model and mimic it should be remembered that the cells of the wings are open in *Hypolimnas* but closed in *Danaus*.

This species is a common insect throughout the Nairobi area. The two female forms illustrated appear to be equally frequent. The food-plant of the larvae is a small *Portulaca* with linear leaves.

Genus *Salamis* Bdv.

This genus contains a few large and striking butterflies with a marked hook behind the apex of the forewing and a tail at the end of vein 4 of the hindwing.

Salamis parhassus aethiops Pal. (Plate 39, Fig. 7)

Is sometimes known as the "mother of pearl" butterfly. It is an insect of great beauty, the ground colour being a delicate shade of green with, when viewed from different angles, a violet sheen of varying intensity. The markings are black with the exception of the "eye" near the rear margin of the hindwing which has a reddish-orange centre.

This butterfly is unlikely to be mistaken for any other insect.

The species is often common in wooded areas where it floats gracefully along about 12 feet from the ground.

Salamis anacardii nebulosa Trim. (Plate 39, Fig. 6)

Has a white or cream ground colour; but in this species also there is a mother of pearl sheen although the sheen is much less obvious that in the preceding one. The markings are black and more extensive than in *S. parhassus aethiops*. Like the latter, this butterfly is found in forests; but we have seen it in large numbers in more open, bush country also.

Genus *Precis* Hbn.

This is a large genus of pretty, medium-sized butterflies many of which occur at all altitudes from the coast up to, at least, 7,000 feet.

Precis oenone cebrene Trim. (Plate 40, Fig. 3)

Is an orange and black butterfly with a round, blue or purple spot near the anterior margin of the hindwing. It is an ubiquitous species in fairly open country and marshy areas.

Precis clelia Cr. (Plate 40, Fig. 4)

Has the forewings black with white patches and a few, small, orange-red markings. Two of the latter are "eyespots" with blue centres surrounded by black rings and then with orange-red. The hindwings are black with white lines along the outer margins, a large, brilliant blue or purple circular spot near the anterior margin and two eyespots similar to those of the anterior wings. This species is common wherever the preceding is found. Like *Precis cebrene* it is fond of basking in the sun on bare patches of soil.

Precis terea elgiva Hew. (Plate 40, Fig. 2)

Is a dark brown species with a yellow band running across both wings, lighter brown markings near the front margin of the forewings and a row of "eyespots" bordering the outer edge of the yellow band of the hindwings. Unlike the two previous species of the genus this is a forest-loving species.

Precis tugela Trim. (Plate 40, Fig. 1)

Merits the name of the "dead-leaf precis." On the upper surface the ground colour is dark brown and a reddish orange bar, deeper and richer in colour than in the previous species crosses both wings. There are some indistinct brown markings near the anterior margin of the forewing and three white dots, of which the centre one is much the more prominent, in a line near the apex. Black dots occur in the transverse band on both wings: there is a marked hook behind the apex of the forewing as in the genus *Salamis* and the hindwings come to a point at the posterior angle. When the butterfly is at rest on a twig the "tails" of the hindwings resemble a leaf-stalk and the brown colour of the underside, darker on one side of where the midrib would be, gives the insect the appearance of a dead leaf. This species does not appear to be so common as the three preceding species.

Precis octavia Cr.

Is one of the best examples of seasonal dimorphism. The dry season form that occurs locally is *P. octavia sesamus* Trim. (Plate 40, Fig. 10) the southern race of the species. The general colour is blue. The markings are black, with the exception of two white spots near the apex of the forewing and a band of red spots extending from below the second white spot across both wings to the inner margin of the hindwing.

Precis octavia natalensis Stgr. (Plate 40, Fig. 8) is the wet season form of *P. octavia sesamus* and is a rosy-pink or red insect with black markings. In addition, we have photographed (Plate 40, Fig. 9) a specimen caught in Karura forest of a form intermediate between the wet and dry forms. This specimen is similar to the dry season form, but the red spots form a continuous band which on its inner edge diffuses into a lilac coloured area. The black dots on the inner edge of the band are, therefore, prominent as in the wet season form. The dry season form is usually larger than the wet. In the Nairobi district, it is not uncommon to see both forms flying together.

This species is not so common as *Precis cebrene* or *P. clelia;* but is seen quite often in gardens and in wooded areas. Like some of the other species of the genus, it enjoys basking on bare soil. The larvae feed on *Coleus barbatus.*

Genus *Vanessa* Fab.[1]

Vanessa cardui (Linn) (Plate 40, Fig. 6).

The "painted lady" is one of the few insects that have an almost world-wide distribution. It occurs in Europe (including England), Asia, Africa, and America. In Kenya, it has been seen by us at altitudes from sea-level to 10,000 feet and it is quite probable that it occurs even higher. The upper surface is orange-brown with dark brown markings. There are white spots in the dark apical area of the forewings and fine, curved, white lines between the nerves along the outer margins of both fore- and hindwings. The under surface is very beautiful; but the complicated pattern is difficult to describe.

V. cardui, although so widely distributed, is never plentiful. Individuals appear to be long-lived and to take possession of a definite territory, for example, a certain flower-bed where they are to be seen on sunny days for several weeks. They flit from flower to flower and sun themselves on open patches of bare soil like some of the *Precis.*

The caterpillar, which is black with yellow spines is found in Europe on thistles, and many other plants. In Kenya, *Malva verticillata* and a species of *Cynoglossum* are eaten.

Family *SATYRIDAE.*

Most members of this family are brown in colour hence they are often spoken of as "the Browns."

Genus *Melanitis* Fab.

Melanitis leda (Linn) (Plate 41, Fig. 8).

The "twilight brown" has the ground colour dark brown. Towards the apex of the forewing is an orange-red area contain-

[1] See Notes on Nomenclature, page 228.

ing a fairly large, black spot in which are two, smaller white spots. Near the rear of the hindwing is a very small white spot. This butterfly, in shape, colouring and markings is rather variable.

The species has a very wide distribution in Africa, Asia, and Australia. During the sunny periods it hides in shady spots in woods and it flits about in the evening. The caterpillar is yellow with green stripes and two horns on the head. The food-plants, as of most of the family, are grasses.

Genus *Mycalesis* Hbn.

Mycalesis safitza Hew. (Plate 41, Fig. 6)

Is dark brown above, with a small area tinged with yellow towards the apex of the forewing. On the forewing are two, black, white-pupilled "eyespots." Near the rear margin of the hindwing is a very small pin-point of white. This species occurs throughout Africa, south of the Sahara, and is often very common in the forests around Nairobi.

Genus *Neocoenyra* Btlr.

Neocoenyra gregorii Btlr. (Plate 41, Fig. 7).

The general colour is dark brown, the inner portions of the wings being slightly darker than the rest. The black "eyespot" on the forewing contains two pin-points of white which do not show up in the illustration. The light-coloured ring in this "eyespot" is reddish-yellow. On the hindwing are four more "eyespots," the two central ones being the larger. Like the last two species, this butterfly is found in forest glades or where there are enough trees to give heavy shade.

Family *PIERIDAE.*

The *Pieridae* or "Whites" are a large family of world-wide distribution. Three species of *Pieris,* known as "cabbage-whites," are responsible for much damage to cabbages and other cruciferous plants in England; but these species do not occur in Kenya.

Genus *Phrissura* Btlr.

Phrissura sabina phoebe Btlr.

Male (Plate 43, Fig. 1), upperside white with black, triangular tips to the forewings; underside white with the anterior edge of the hindwing orange and with small black dots at the extremities of the veins. Female (Plate 43, Fig. 2), ground colour of the upperside white, dusted in places with lemon-yellow and the anterior half of the basal area orange. In some specimens the upper surface of the hindwings is yellow. The forewings have black anterior margins and tips, the edges of the black being more or less speckled. There are black dots at the ends of the veins of the hindwings. The underside of the female

resembles that of the male except that the base of the forewing is orange anteriorly.

During 1942, this species was very common in Karura forest. It has also been seen in much smaller numbers in other parts of the district.

Genus *Mylothris* Hbn.

Mylothris agathina Cr.

The male (Plate 43, Fig. 3) has the upperside white: the forewings have a black front margin and black tips and there are round black dots along the outer margins of both wings. The female (Plate 43, Fig. 4) is yellow, slightly tinged with pink towards the base of the wings, with a black margin, black tips and black dots as in the male. The underside is yellow with similar black markings to those of the upperside.

This is a widely-distributed species, common in most parts. The food-plant is *Loranthus woodfordianus*.

Mylothris ruppelli Koch. (Plate 43, Fig. 5).

The upperside is white except for the basal area of the forewing which is orange. The forewing has a black front margin, a black tip and black dots along the outer margin: the hindwing has a little orange and dusky scaling near its base. In the female the orange basal area is more extensive and less bright than in the male and the black dots along the outer margins of the forewings are larger. The underside is white with the orange basal area as on the upperside of the forewings and with faint dots on the margin of the hindwings.

This species is seasonally common at Kabete.

Mylothris rubricosta Mab.

The male (Plate 43, Fig. 6) of this species is rather like the last in appearance but smaller. The orange basal area is, moreover, restricted to the anterior portion of the wing and it extends in a thin line behind the anterior black margin. The black tips are less obvious than in the last species and the white scaling of both wings is rather thin so that the wings are partially transparent. The female differs in having the ground colour of the wings greyish instead of white.

This species is common in the neighbourhood of ponds and swamps. The food-plant of the larvae is *Polygonium barbatum*.

Mylothris sagala jacksoni E. Sharpe (Plate 43, Fig. 7).

The upperside of the forewings is black with white markings as in the figure and the hindwings are pale lemon-yellow with a small, black basal area and a broad, black band around the anterior edge except near the base. The underside of the forewing is white: of the hindwing pale lemon-yellow.

This species is fairly common at Kabete. The larvae feed on *Loranthus friesorum*.

Genus *Eronia* Bdv.

Eronia thalassina Bsdv. (Plate 43, Fig. 8).

This is a large species with the upper surface a very pale duck-egg blue in the male or white in the female and with black markings as in the figure.

This species is common in Karura forest during November to February; but is very difficult to capture owing to its habit of flying around the tops of the trees. It rarely comes sufficiently low to be within reach of the net.

Genus *Syncloë* Hbn.

Syncloë helice johnstoni Crowl. (Plate 43, Fig. 9)

Has the upperside white with black markings. The underside of the forewings is white with green-grey markings along the veins near the apex of the wings and some golden scales; the hindwings have the veins broadly delineated with green-grey scales, the lines being edged with gold. The underside of the wings forms a ready character for differentiating this species from some of the next genus which it resembles superficially.

This species occurs in open grassland and adjacent gardens. The larvae feed on *Reseda pruinosa*.

Genus *Glycestha*.

This genus contains a number of common "whites" which are not easy to differentiate. The males are usually white or cream with dark grey or black markings on the upper surface. On the under surface the forewings carry markings similar to those of the upperside. The hindwing undersides are white or yellow with the veins prominently demarcated with brown scales. The females are white or yellowish, sometimes with a pearly irridescence, and have dark brown or black borders.

Glycestha zochalia (Bsdv.).

The male (Plate 43, Fig. 10) is distinguished by the fact that the cell on the underside of the hindwings has two, fine, longitudinal, brown lines in it and that the pale spots in the apex of the forewing reach to the edge of the wing, there being no continuous black line along the margin. The female is similar to the male but has, above, a creamy ground colour with a faint pearly sheen. There are only indistinct light spots in the broad marginal band of the forewing and the hindwing has a dark network around the margin. As in the male the cell in the hindwing underside contains two longitudinal brown lines.

This species seems to be the most common in gardens at Kabete.

Glycestha severina (Cr.).

The male (Plate 43, Fig. 12) has a broad, black border to both wings with only small spots of ground colour in the band. The female (Plate 43, Fig. 11), on the upperside, has the basal two-thirds of the wings cream with a pearly lustre and the outer third brownish-black. The underside has a creamy-yellow ground colour deepening to a golden or ochre shade near the base; the forewings are marked with a broad border in which are situated a number of triangular spots of ground colour and the hindwings with a similar border and with a network of brown lines extending along the veins to the base.

The food-plants of the larvae are *Capparis* spp.

Glycestha aurota (Fab.)[2]

Is another species perhaps not so common generally as the last two, although at certain times it appears in large swarms. The male is similar to that of *G. zochalia;* but may be distinguished by the absence of the two longitudinal lines in the cell on the underside of the hindwing. The female is somewhat similar to that of *G. severina* but has the spots in the broad border on the underside of the forewings at least as broad as the dark edge of the band on the inner side.

The larvae of this species also feed on *Capparis*.

Genus *Leptósia* Hbn.

Leptosia alcesta (Cr.).

The "flip-flop" (Plate 43, Fig. 13) is a small white butterfly with rather rounded wings. The forewings on the upperside have black markings at the tip and a round black dot. This species is common along the lanes in Karura forest. It flies low and has a characteristic, slow flight. The larvae feed on *Richiea* sp.

Genus *Colotis* Hbn.

This large genus of fascinating butterflies is widely distributed through Africa and parts of Asia. It includes the local orange, red and purple-tipped species. Most of them are very variable since they show seasonal and sexual dimorphism and have many local races. Generally speaking the wet-season forms show more black than dry-season forms. The two species selected for illustration are probably the commonest occurring in the western part of the Nairobi district with which we are better acquainted.

Colotis evippe omphale (Godt.) (Plate 43, Fig. 14)

Is a black and white butterfly with red or orange markings in the black apical area of the forewings. The wet female forms sometimes have the ground colour yellow and are often heavily marked with black.

At Kabete this species is not so common as the following.

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[2] See Notes on Nomenclature, page 228.

Colotis antevippe zera (Lucas)

Is a very common species in open Kikuyu-grass country. The male (Plate 43, Fig. 15) is white with scarlet tips and black markings. The specimen illustrated is a dry-season form; but more extreme examples with less-conspicuous black markings at the ends of the veins of the hindwings are sometimes seen. The wet-season forms show more black; in particular some black will be found between the scarlet at the tip and the white ground colour. The underside is white with a variable amount of blackening of the veins and some orange at the apex of the forewings. The female (Plate 43, Fig. 16) is a pale primrose yellow with a deeper yellow or golden-brown apical area and very dark brown to black markings. The yellow or golden-brown apical area of the forewings includes the spaces at the tip and extends a small but variable distance to the inside and behind the inner dark band before fading off gradually into the ground colour. The underside of the female forewing is pale yellow with a pale salmon tip and with grey or black markings. The hindwings beneath are sandy with very fine, brown flecking.

Genus *Catopsilia* Hbn.

Catopsilia florella (Fab.) (Plate 43, Fig. 17).

Throughout the year at Kabete this species is seen more often than any other. On the upperside the ground colour of the male is a greenish-white and that of the female pale yellow. The upper surface has a black dot at the end of the cell, the dot being larger in the female than in the male. In addition, the female has small brown spots at the marginal ends of the veins of the forewings and minute ones similarly placed on the hindwings. The under surface has a delicate mottled pattern. The shape of the wings of this butterfly is fairly characteristic.

This species is common and will be found throughout the year visiting flowers during sunny periods. The food-plant of the caterpillars is *Cassia* sp.

Genus *Terias* Swains.

This is a genus of small butterflies, all of which are yellow with dark brown or black markings. Four species occur in Africa; but some of the species have a number of forms and identification by wing pattern is often difficult.

Terias hecabe maculata Auriv.

The upperside (Plate 44, Fig. 2) is yellow with a dark apex and outer border to the forewings. There are black dots at the ends of the veins on the hindwings. The underside (Fig. 6) has a dark brown pattern of fine lines and a reddish-brown spot near the apex of the forewing.

Terias hapale Mab.

The upperside (Plate 44, Fig. 3) is pale yellow with dark brown markings at the tip of the forewings. These markings do not extend so far posteriorly as in the previous species.

Terias desjardinsi marshalli Btlr.

The upperside (Plate 44, Fig. 4) is yellow with a black border reaching to the posterior angle. The hindwings have a very narrow black border or the line is broken into dots. The underside (Fig. 8) is yellow with a rusty area at the tip of the forewings and darker brown spots and markings.

Terias brigitta zoe Hopff.

The male (Plate 44, Fig. 7) is a bright yellow form with a black or dark brown border to both wings. The female is larger and has the border of the forewings broken near the posterior angle. Its yellow areas are usually dusted with grey scales. The under surface, in both sexes, is a paler yellow, particularly on the hindwings where there are faint greyish markings in the form of short arcs.

Genus *Colias* Fab.

A widespread genus, the members of which are usually called "clouded yellows."

Colias electo (Linn).

Male (Plate 44, Fig. 1) has the wings rich orange with a broad, dark brown border around both wings, a black spot at the end of the cell of the forewing and an orange-red spot at the end of the cell of the hindwing. The female occurs in two forms. The typical form has the ground colour rich orange as in the male. The other, ab. *aurivillius* Kef. (Plate 44, Fig. 5), is a pale, greenish-white. In both forms the broad border of the wings is interrupted by spots, yellow in the case of the typical form and of the ground colour in the other. On the under surface, the forewings have a broad, greenish border and the hindwings have a greenish ground colour, deeper towards the base. The hindwing has two silver spots edged with brown near the end of the cell.

The larvae feed on lucerne and other herbaceous, leguminous plants.

Family *PAPILIONIDAE.*

Genus *Papilio* Linn.

Although some of our East African species have no tails, the butterflies of this genus are usually called "Swallowtails." Amongst them are some of our most beautiful insects. Most of them are large and related genera contain the "Birdwings," the largest of all insects.

Papilio demodocus Esp. (Plate 42, Fig. 8)

Has the sexes similar. The upperside is black with yellow markings and on the hindwing are areas near the base and in the centre where a mixture of black and yellow scales produces a grey effect. The inner margin of the hindwing has an "eyespot" with blue markings anteriorly and a red half-moon posteriorly. The anterior margin of this wing also carries an "eyespot" consisting of an orange-brown centre surrounded by a silver-blue line and then a black ring. The underside is dark brown with yellow markings generally similar to those above. The "eyespots" of the hindwing are reproduced below and there are other, short, silver-blue and orange-brown marks.

An aberration, *nubila* Capr., occurs differing from the type form in having the ground colour dark brown instead of black and the markings a dull, deep yellow instead of bright. This aberration appears to be much less common near Nairobi than it is at the coast where it is often as common as the typical form.

Except in the forests this species is probably the commonest *Papilio* in the Nairobi district. The eggs are laid singly on the small tender leaves near the ends of the shoots of citrus trees and the larvae are usually very easy to rear. The indigenous "Cape Chestnut," *Calodendron capense* Thunb. is another food-plant.

Papilio dardanus tibullus Kirby.

The male (Plate 42, Fig. 1) is pale yellow with black markings as in the figure. On the underside the ground colour is yellow and there are brown markings generally similar to those above; but with, in addition, the veins of hindwing delineated. Whereas the male is a typical swallowtail with fine tails the local females have rounded hindwings and mimic various danaids. The two forms illustrated are those most frequently seen near Nairobi. *Papilio dardanus* ♀-form *cenea* Stoll. (Plate 42, Fig. 2) is a mimic of *Amauris albimaculata*. The forewings are black with white spots and the hindwings a sandy-yellow with a broad, black border containing small, pale spots. The ♀-form *hippocoon* Fab. is a mimic of *Amauris niavius dominicanus* and like its model is black and white with a bluish sheen when flying. In distinguishing mimics and models, the fact that the *Papilionidae* have only one anal nervure on the hindwing should be kept in mind.

Papilio dardanus is a fairly common species in Karura forest and other parts of the district throughout the year. The male has a typical, swallowtail flight; but the females float about in the air in the same way as their models. Citrus trees and *Teclea trichocarpa* Engl. are among the food-plants of the larvae.

Papilio nobilis Rog. (Plate 42, Fig. 4)

Is brownish-yellow with deeper brown markings. It is a fairly common species in Karura forest, and we have seen occasional specimens in other parts of the district. The larvae feed on *Warburgia ugandensis* Sprague.

Papilio nireus lyaeus Dbl. (Plate 41, Fig. 2)

Is a beautiful velvet-black butterfly with a line of contiguous, metallic, blue-green spots extending across both fore- and hind-wings. There are two further spots near the apex of the fore-wing and a row near the outer margin of the hindwing. On the underside, the male (Fig. 3) can be distinguished from the female (Fig. 1) by the row of buff-coloured spots running parallel to the outer margin of the hindwing.

This species is fairly common in the Nairobi area, large numbers often being present in Karura forest in November. We have reared the adults from larvae collected on citrus trees.

Papilio phorcas ansorgei Rothsch. (Plate 42, Fig. 5)

Is a velvet black insect with green spots near the apex of the forewing and a triangular green patch extending across both wings. There are, in addition, faintly green spots a short distance from the margin of the hindwing. The under surface is in parts brown and in parts grey with silvery reflections. There are pale duck-egg blue markings corresponding to the green ones on the upper surface. The sexes are similar but ♀-forms in which the green on the upper surface is replaced by yellow or yellowish-green also occur.

This species is essentially a forest insect and at certain times is very common in Karura forest. The yellow and yellowish-green forms of female are much less numerous than the typical form. The larvae feed on *Teclea viridis* Verdoon.

Papilio rex Oberth. (Plate 41, Fig. 4)

Is a black butterfly with the spots pale yellow except for the two at the base of the forewings, which are brown. This butterfly is not common; but it has been reported from Karura forest and is included in this article because it is a mimic of *Danaus* (*Melinda*) *formosa*. The larval food-plant is *Teclea trichocarpa* Engl.

Family *LYCAENIDAE*.

This is a large family of small butterflies commonly known as blues, coppers or hairstreaks, according to their prevailing colours. Many of them are very beautiful. Identification is often difficult and particular attention should be paid to the undersides. Only a few of the commonest species can be mentioned here.

Genus *Cacyreus* Btlr.

Cacyreus lingeus (Cr.).

The male is light blue above, somewhat darker at the margin. The female (Plate 44, Fig. 9) is dark grey-brown with a bluish reflection when seen from certain angles. In the latter sex there is a black mark, bordered on both sides with white, at the end of the forewing cell, pale, poorly-defined spots near the margin of the forewing and pale spaces between the veins of the hindwing. The underside (Plate 44, Fig. 14) is white with characteristic, dark brown or almost black markings as in the figure and two peacock-green spots, the outer of which is the larger near the posterior angle of the hindwing. There is one short tail.

This species is common in gardens at Kabete. The larvae feed on species of *Coleus*.

Genus *Syntarucus* Btlr.

Syntarucus telicanus (Lang)[3] (Plate 44, Fig. 10)

Is a grey-brown butterfly with pale markings as in the figure. As in the last species, the wings show a bright blue reflection when the light is correct. The underside (Plate 44, Fig. 15) is white with many grey-brown spots of various shapes. The hindwings have short tails and at the posterior angle there are, on the upperside, two black spots and, on the underside, two peacock-green ones surrounded by yellow rings.

This is a common African species. The larvae are found on *Plumbago*.

Genus *Cosmolyce* Tox.

Cosmolyce boeticus (Linn).[1]

The male of this species (Plate 44, Fig. 13) is one of the most beautiful of our "blues." The upper surface is a bright violet-blue, both wings having a narrow, brown-black line around the outer margin and a narrow white fringe. At the posterior angle of the hindwing there is a short tail and two blue-black dots, the outer of which is considerably larger than the inner. The female (Fig. 17) is smaller and greyish-brown in colour with faint, pale markings and a blue reflection most marked over the inner two-thirds of the wing surface. The underside (Fig. 18, a male) is mainly greyish-yellow with brownish markings and an almost white band across the hindwings a short distance from the margin. The two posterior spots on each hindwing underside are peacock-green nearest the margin and black on the inside.

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[3] See Notes on Nomenclature, page 228.
[1] See Notes on Nomenclature, page 228.

The larger, more lateral spot is enclosed in a small orange square, the outer edge of which it touches and, in addition, there is a little orange on the inner side of the other spot.

This butterfly has an almost world-wide distribution being found in parts of all the five continents. At times it is plentiful near Nairobi. The larvae feed in the pods of leguminous plants.

Genus *Cupido* Schrank.

Cupido gaika Trim.[4] (Plate 44, Fig. 11)

Is a dark brown butterfly. The whole of the wing surface, except near the margins, which in the female are somewhat darker than the rest of the wing, shows blue reflections. There are no tails; but a whitish fringe, slightly broader on the hindwing than on the forewing is present. The under surface (Plate 8, Fig. 16) is silver-grey with black-centred, white spots and brownish markings. The larvae of this very common species feed on *Justicia* sp.

Cupido stellata Trim. (Plate 44, Fig. 12)

Is a small, dark brown species with numerous white spots on the upper surface of both wings and pale fringes. This species is fairly easy to recognise.

It is a common insect in open grassland where numbers may be found on the flowers of *Erlangea marginata*.

Family *HESPERIIDAE*.

In many ways the "skippers" differ from the majority of other butterflies. For example, the body is relatively stout, the pupae are in a cocoon and many species fly in the cool of the evening rather than during the heat of the day. Most of the members of the family are small and of sombre coloration, but there are a few outstanding exceptions. They occur throughout the world.

Genus *Coeliades* Hbn.

This genus contains the majority of the larger African "skippers" and some of them are rather striking insects. They are rapid fliers darting from flower to flower so fast that it is often difficult for the eye to follow them.

Coeliades forestan (Cr.) (Plate 44, Fig. 19)

Is a dull, brown insect with a pale, whitish area on the hindwing. The fringe inside the posterior angle of the hindwing is orange and on the underside the hindwing is crossed by a broad white band. There is another small white spot on the inner margin of this wing just in front of the posterior angle.

This species is common in the more open parts of the district. The larvae are found on *Indigofera tinctoria*.

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[4] See Notes on Nomenclature, page 228.

Genus *Eretis* Mab.

Eretis lugens (Rogen.) (Plate 44, Fig. 27)

Is a black butterfly with thin patches of deep copper-coloured scales on the wings. The underside is dark brown. A closely-related species, *E. djaelaelae* (Wall.) has the underside of the hindwing and of most of the forewing red.

Eretis lugens is a common species in most parts of the district. It is usually found in shady spots. The food-plant of the larvae is a species of *Justicia*.

Genus *Metisella* Hemming.

Metisella quadrisignata nanda Evans (Plate 44, Fig. 22)

Is a black butterfly, lightly dusted with orange scales near the bases of the wings, with four bright orange spots on the forewings and with a number of rather indistinct orange markings on the hindwings.

This species is probably more numerous in forested than in open country.

Genus *Zenonia* Evans.

Zenonia zeno (Trim) (Plate 44, Fig. 20)

Has the upperside dark brown with orange markings. On the under surface the markings of the forewing resemble those above. The underside of the hindwings carries ochre-yellow markings.

This and the next species are the commonest "skippers" of the district. The larvae feed on grasses.

Genus *Gegenes* Hbn.

Gegenes letterstedti brevicornis (Plotz).

The male (Plate 44, Fig. 23) is a brown insect slightly paler near the base of the wings. The whole of the surface has an old-gold sheen and there is a pale fringe to the hindwings. The female (Fig. 24) has some small yellow spots on the forewing. The under surface of the hindwing is ochre-yellow with fine brown markings.

This species appears to be the commonest skipper throughout the district. There is another, less common, species *Gegenes hottentota* (Latr.) which is very similar.

Notes on Nomenclature.

For those interested we submit the following explanations of changes in names from those used in Seitz.

1. We have accepted the recommendations of the Royal Entomological Society's Committee on Generic Nomenclature in adopting the following combinations:—

Vanessa cardui (Linn., 1758).
Cosmolyce boeticus (Linn., 1767).

and in accepting *Danaus* Kluk, 1802, as the correct generic name for *Danaus plexippus* (Linn., 1758) with which *chysippus* (Linn., 1758) is congeneric. See Hemming, F., (1933 and 1934 a & c).

2. This species has, until recently, been known as *Belenois mesentina* (Cram., 1780). *Mesentina* is, however, a homonym and the next available name is *aurota* Fab., 1793. The type of *Belenois* Hbn. is *calypso* Drury with which *aurota* is not now considered congeneric. Hemming (1934 b) refers *aurota* to *Anaphaeis;* but more recently Wiltshire (1940) uses the combination *Glycestha aurota* (Fab.). Unfortunately, we have not traced a definition of this genus; but we have tentatively referred both *severina* Cr. and *zochalia* Bsdv. to it.

3. This name is used *sensu lato*. We have not attempted to differentiate the closely related species by dissection of the male genitalia.

4. We have retained *Cupido gaika* Trim. while realising that it may be necessary to alter the specific name to *hylax* (Fab., 1775). See Corbett (1940).

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CORYNDON MEMORIAL MUSEUM EXPEDITION TO THE CHYULU HILLS.

X. COLEOPTERA. (Part 3.)

By A. F. J. Gedye, F.R.E.S., F.Z.S.

Since the publication of the sixth of this series of reports a considerable number of named *Coleoptera* have been returned by the British Museum (Nat. Hist.). Most of the beetles collected by the expedition have now been identified and it is unlikely, in the present circumstances, that further determinations will be received. This paper, therefore, concludes the enumeration of the *Coleoptera* collected in the Chyulu Hills.

Family *STAPHYLINIDAE.*

Many specimens of this family were collected in buffalo dung and it has been possible to identify a fair number. The description of new species will have to wait until happier times. None of the species appear to be restricted to any particular altitude in the hills.

1. *Stenus subopacus* Fauv.
   Four specimens. Not uncommon in the Nairobi District.

2. *Paederus pedestris* Gerst.
   Four specimens. New to the collection. The so-called "Nairobi Fly," which causes an inflammation of the skin, belongs to this genus.

3. *Paederus annexus* Epp.
   Three specimens. There are specimens in the Museum collection from Kampala and Kaimosi.

4. *Paederus sabaeus* Er.
   Seventy specimens. Very common throughout East Africa.

5. *Astenus guttipennis* Fauv.
   Twenty-six specimens. New to the Museum collection. There are also five specimens of a paler variety.

6. *Charichirus katonae* Bernh.
   One specimen. New to the collection.

7. *Philonthus abyssinicus* Fauv.
   Two specimens. Common and widely distributed in East Africa.

8. *Philonthus vittiger* Fauv.
One specimen. New to the collection.

9. *Philonthus vittatus* Roth.
Five specimens. Not uncommon at Nairobi.

10. *Philonthus methneri* Bernh.
Twenty-six specimens. A large and conspicuous species. New to the collection.

11. *Philonthus nitidicollis* Klug.
One specimen. New to the collection.

12. *Philonthus morio* Boh.
One specimen. A common species.

13. *Philonthus bisignatus* Boh.
One specimen. The Museum has specimens from Nairobi and Naivasha.

14. *Philonthus circumcinctus* Epp.
One specimen. New to the Museum.

15. *Philonthus peregrinus* Fauv.
One specimen. A common species.

16. *Philonthus peregrinus* var. *scutatus* Epp.
A variety with reddish elytra. Sixty-one specimens were collected of this abundant species.

17. *Philonthus katonae* Bernh.
One specimen. New to the collection.

18. *Atheta obtusideus* Epp.
One specimen. New to the Museum.

19. *Zyras bihamatus* Fauv.
One specimen. New to the collection. The members of this large genus are inhabitants of ants' nests and bear a superficial resemblance to their hosts when running with them.

20. *Zyras grandiceps* Bernh.
One specimen. New to the collection.

21. *Zyras burtti* Bernh.
One specimen. New to the collection.

22. *Myrmechusa mirabilis* Wasm.
One specimen. New to the collection. This is also a myrmecophilous genus.

23. *Aleochara bohemani* B. & S.
Sixteen specimens. New to the collection.

24. *Aleochara bicoloripennis* Bernh.
Six specimens. Also occurs in the Nairobi area.

25. *Aleochara angusticollis* Bernh.
Four specimens. New to the Museum.

26. *Aleochara bilineata* Gyll.
Eleven specimens. New to the collection.

27. *Holosus singularis* Gerst.
One specimen. New to the collection.

Species which were unrepresented in the British Museum collection have been submitted to Dr. Malcolm Cameron and as a result he has published (*Ann. & Mag. Nat. Hist.*, 1942, **53,** S. II, p. 321) descriptions of eighteen new species collected by the expedition.

The names of these species are as follows:—

Eleusis unicolor.	*Lispinus coryndoni.*
Megarthrus monticola.	*Omalium montivagans.*
Oxytelus monticola.	*Stenus chyuluensis.*
Stenus coryndoni.	*Medon aethiopicus.*
Lithocharis simplex.	*Philonthus satanus.*
Philonthus diabolicus.	*Philonthus nigricolor.*
Philonthus chyuluensis.	*Philonthus coryndoni.*
Staphylinus africanus.	*Staphylinus montanus.*
Atheta chyuluensis.	*Aleochara imitator.*

All types are in the collection of the British Museum.

Family *SILPHIDAE.*

28. *Silpha micans* F.

Six specimens. Common from the south of the Sahara to the Cape in decaying carcases.

Family *NITIDULIDAE.*

29. *Carpophilus binotatus* Murr.
Fourteen specimens. New to the collection. Found in rotting fruit.

30. *Carpophilus dimidiatus* F.
One specimen. Common and generally distributed.

Family *CUCUJIDAE.*

31. *Silvanus surinamensis* L.
One specimen. This species has a cosmopolitan distribution.

Family *COCCINELLIDAE*.

The members of this large family are well-known as "Lady Bird" beetles and are universally distributed. The colour pattern of spots and stripes in most species is subject to great variation and renders their determination of some difficulty.

The great genus *Epilachna* contains phytophagous species and occurs in all parts of Africa. Most of the other genera are carnivorous and many species are formidable foes of "Mealy Bug." Some species are being bred by the Agricultural Department, in Kenya, and are distributed to planters to combat this pest of coffee.

32. *Epilachna polymorpha* Gerst.
    One specimen. Common throughout East Africa.

33. *Epilachna chrysomelina* F.
    One specimen. Widely spread.

34. *Epilachna hirta* Th.
    Seventy specimens. Very common and widely spread.

35. *Epilachna capicola* Mul.
    Nineteen specimens. Very common.

36. *Epilachna tetracycla* ab. *quadrioculata* Klb.
    Seven specimens. Widely distributed in Kenya.

37. *Aulis annex* Muls.
    Four specimens. Occurs also in Nairobi.

38. *Scymnus luteus* Sic.
    Five specimens. New to the collection.

39. *Chilocorus adustus* Wse.
    One specimen.

40. *Chilocorus quadrimaculatus* Wse.
    One specimen. Not uncommon in the Nairobi area.

41. *Cydonia lunata* F.
    Four specimens. Common and widely distributed.

42. *Cydonia aurora* Gerst.
    Six specimens. Common and widely spread.

43. *Alesia striata* F.
    Four specimens. Common and widely distributed.

44. *Adalia intermedia* Crotch.
    Three specimens. Common and widely distributed.

45. *Thea variegata* F.
One specimen. New to the collection.

46. *Thea variegata* var. *citrina* Sic.
One specimen. Common and widely distributed.

Family *DERMESTIDAE.*

47. *Dermestes vulpinus* F.
One specimen. This species occurs commonly throughout the world in carcases and decaying animal matter of all kinds.

Family *EROTYLIDAE.*

48. *Amblyopus ferrugineus* Gorh.
Twenty specimens. Occurs in fungus.

Family *HYDROPHILIDAE.*

49. *Coelostoma aethiopicum* D'Orch.
One specimen. New to the collection.

50. *Sphaeridium abbreviatum* Boh.
One specimen.

51. *Dactylosternum antennale* D'Orch.
Five specimens. Common and widely distributed.

52. *Dactylosternum abdominale* F.
Sixteen specimens. Very common in East Africa.

EAST AFRICAN SUCCULENTS.

PART V.

BY PETER R. O. BALLY,

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(DRAWINGS AND PHOTOGRAPHS BY THE AUTHOR.)

PUBLISHED BY PERMISSION OF THE MUSEUM TRUSTEES.

N.O. *ASCLEPIADACEAE*.—CONTINUED.

TRIBE: *CEROPEGIEAE*.

The *Ceropegieae* are allied to the *Stapelieae*.

Succulence is not common in the tribe, and only the genus *Ceropegia* merits description in this paper.

Genus *Ceropegia*.

The distribution of this genus ranges from the warmer parts of China, India, throughout Africa, the Mascarene Islands and to Australia.

In Thiselton-Dyer's *Flora of Tropical Africa*, 4, 1: 390-402 and 620-622 (1904), fifty-nine species are recorded and another fifty have been added since that date; others have also been discovered that have not yet been described.

In habit the East African cercpegias are not very conspicuous and it requires a trained eye to detect them; most of them are slender, trailing or climbing plants, others are erect herbs.

Most species are herbaceous—often with large, underground tubers—others develop succulent stems and leaves; about eleven are recorded as succulent.

A complete survey of the East African species would form an interesting study, but such an undertaking will have to be postponed until after the war, when overseas collections and publications will again be available for consultation.

The present paper is concerned only with the *succulent species* occurring in East Africa.

The *Ceropegieae* are remarkable for their extraordinary flowers which—unlike other flowers—never appear to be fully expanded.

A long, closed, often inflated tube rises high above the corona; this tube terminates in five lobes which are often of considerable length.

PLATE 45.

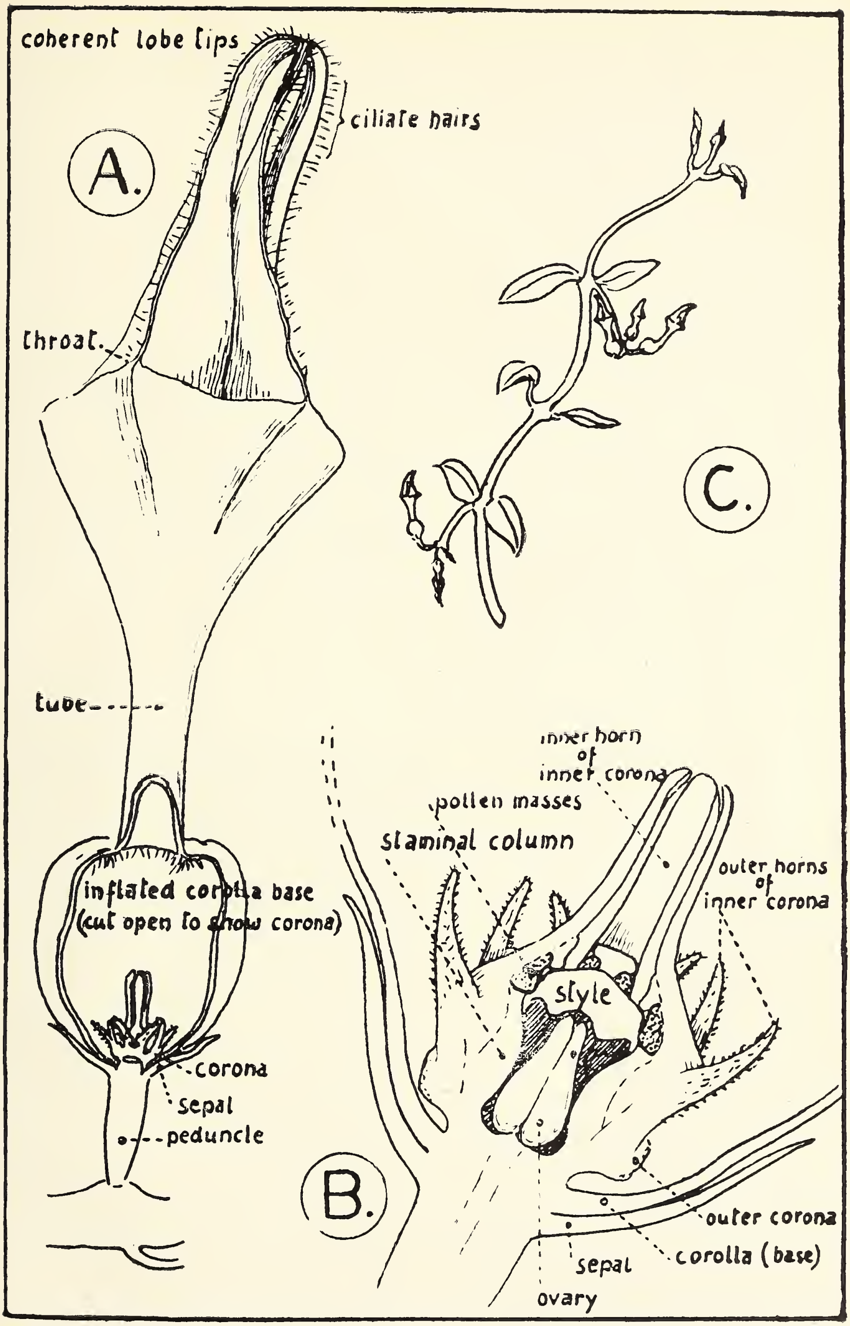


Fig. 1. The parts of a *Ceropegia* (based upon *C.* Bally S70).

(A) Corolla, with basal part cut open.
(B) Corona, cross section.
(C) Flowering growth.

PLATE 46.

Fig. 2. *Ceropegia mozambicensis* Schlechter.

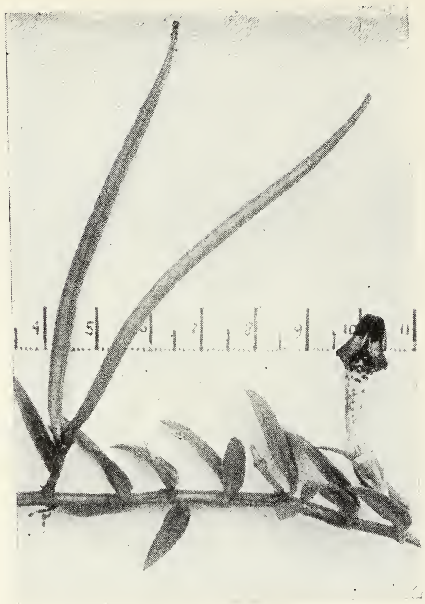


Fig. 3. *Ceropegia* sp. nr. *C. Brownii* Ledger (flower and fruit).

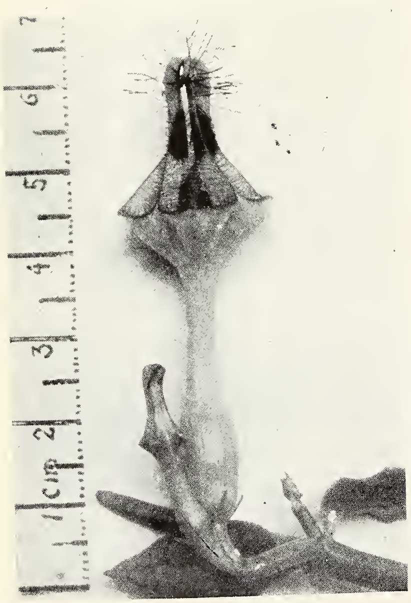


Fig. 4. *Ceropegia* sp. nr. *C. denticulata* K. Schum. (flower).

Fig. 5. *Ceroperia* sp. nr. *C. denticulata* K. Schum. (growth).

Fig. 6. *Ceroperia* sp. nov.? (Bally S48).

Fig. 7. *Ceroperia* sp. nov.? (Bally S83) (flower).

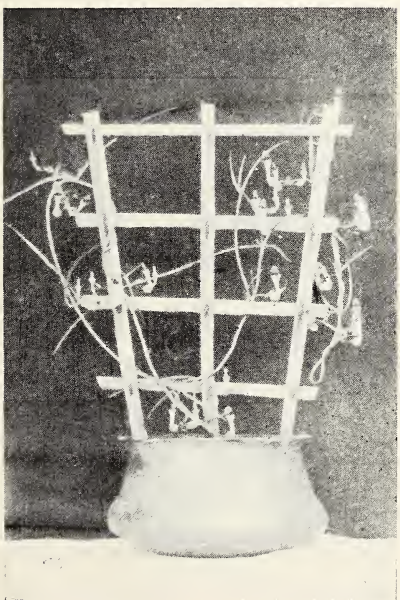


Fig. 8. *Ceropegia* sp. nov.? (Bally S83) (cultivated plant).

Fig. 9. *Ceropegia* sp. n'r. *C. seticorona* E. A. Bruce.

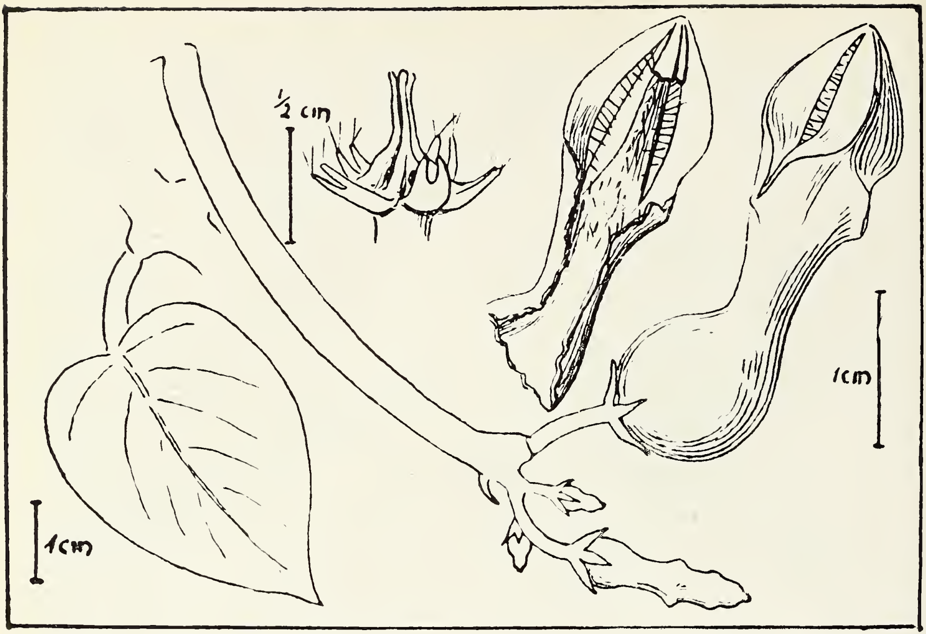


Fig. 10. *Ceropegia* sp. nov.? (aff. *C. seticorona* E. A. Bruce (Bally S72).

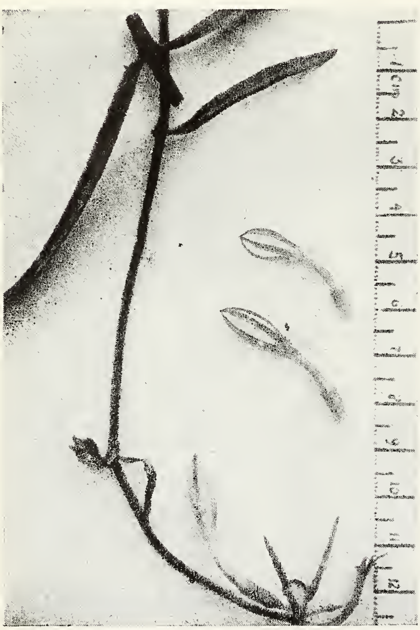


Fig. 11. *Ceropegia stenantha* K. Schum. var. *parvifolia* N. E. Br.

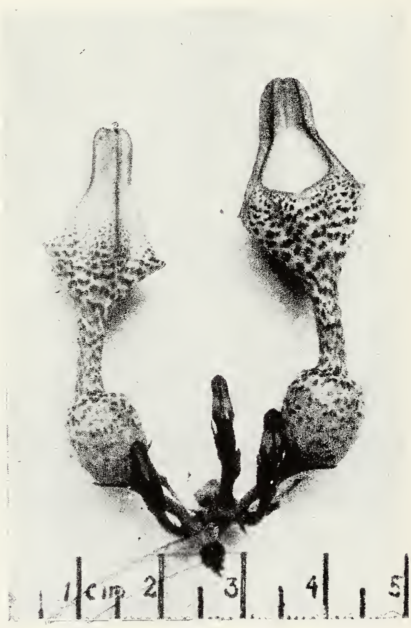


Fig. 12 *Ceropegia succulenta* E. A. Bruce.

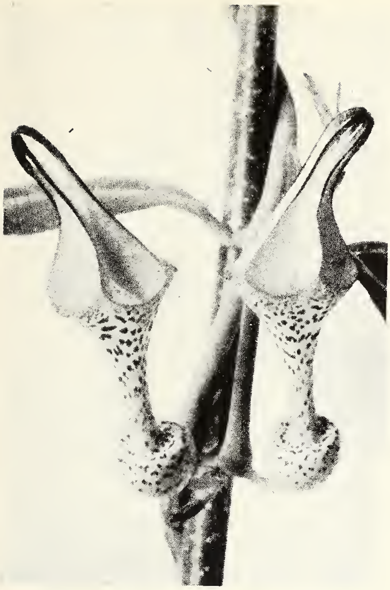


Fig. 13. *Ceropegia* sp. nov.? (aff. *C. succulenta* E. A. Bruce) (Bally S70).

Fig. 14. *Ceropegia* sp. nov.? (Bally S44).

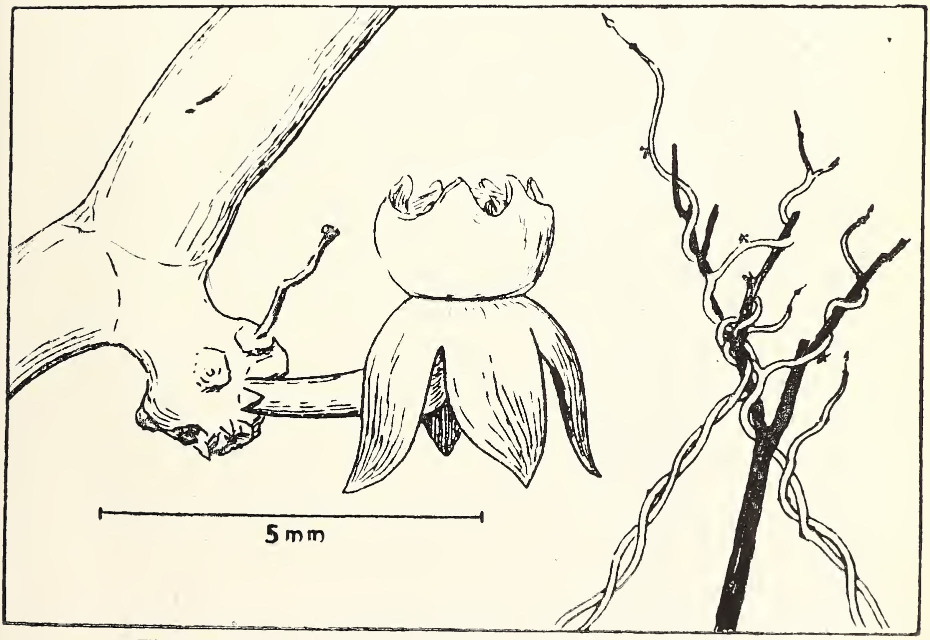


Fig. 15. *Cynanchum sarcostemmatoides* K. Schum.

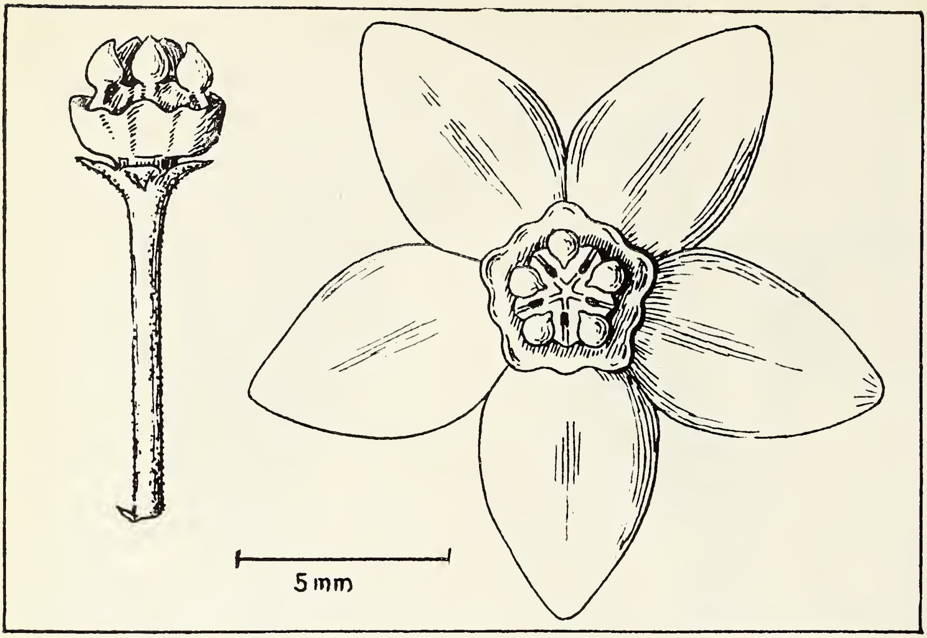


Fig. 16. *Sarcostemma viminale* R. Br.

Fig. 17. *Sarcostemma* sp. nov.
(Coryndon Museum No. 4051).

PLATE 51.

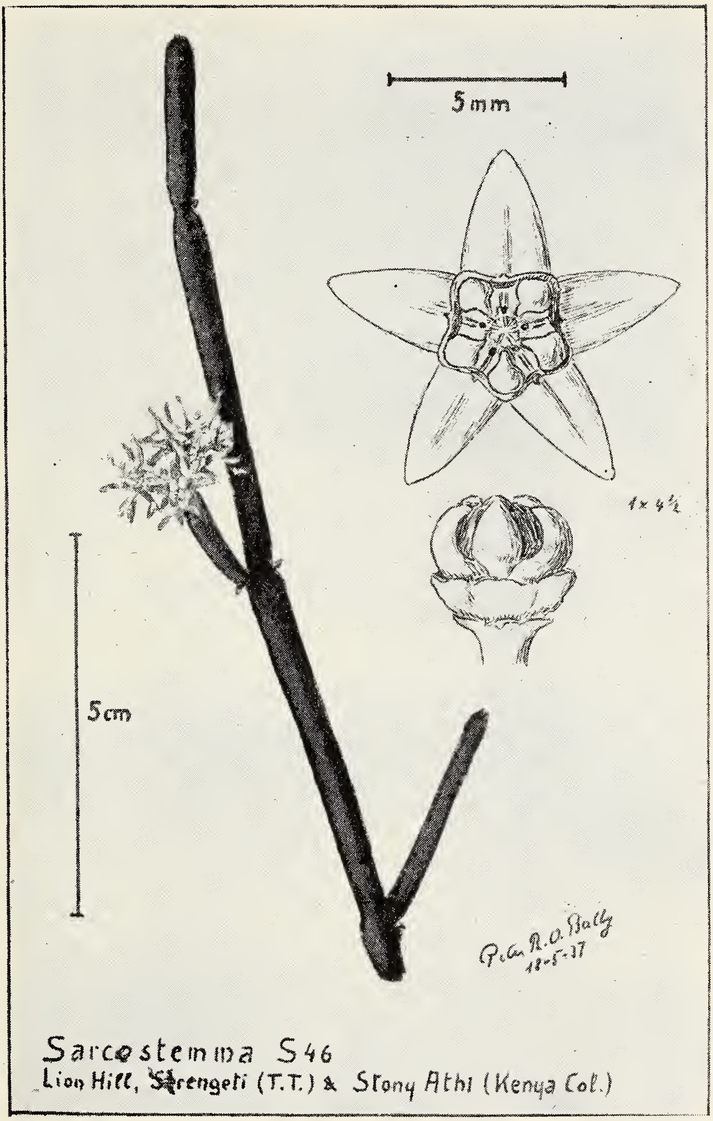


Fig. 18. *Sarcostemma* sp. nov. (Bally S46).

With few exceptions—as in the South African *C. stapelioides* —the lobes are prevented from unfolding and spreading in that their tips remain coherent. Pocket-like apertures at the base of the lobes provide access to pollinating insects to the interior of the tube and down to the corona.

Ciliate hairs are frequently disposed inside the tube and in its inflated base, in such a way that the bristles are pointed downwards and are thus seemingly meant to retain pollinating insects in the neighbourhood of the sexual organs of the flower.

The diagram of the flower of a *Ceropegia* (Plate 45, Fig. 1) will acquaint the reader sufficiently with its structure without necessitating further description.

The fruits are similar to those of the *Stapeliéae;* they consist of two parallel or spreading, slender, horn-shaped follicles. (See Plate 46, Fig. 3.)

Some Far Eastern and South African *Ceropegieae* have long been cultivated as hothouse plants for their curious and often quite large flowers, no less than for their attractive foliage. Such are *C. elegans, C. Sandersonii* and *C. Woodii.*

Many of the East African species, in particular *C. Lugardae, C. denticulata* and others—still undescribed—compare well with the best of the cultivated plants.

Ceropegia distincta N. E. Brown.

This little-known plant was sent to Kew by Sir J. Kirk from Zanzibar; it may have been collected on that island or on the adjacent mainland.

It was described from an incomplete specimen. It has probably twining stems and fleshy leaves up to 7½ cm. long and 5 cm. wide, with acuminate tip and with broadly rounded lobes at the base. The corolla tube is about 2½ cm. long and curved at a right angle above the slightly inflated base.

The corona of the specimen is not sufficiently well preserved to allow an accurate description.

Ceropegia mozambicensis Schlechter.

Stems twining, fleshy, glabrous, with opposite, spreading leaves. Leaf-stalk 6 to 12 mm. long, blade 2 to 4.5 cm. long and 1 to 2 cm. wide, elliptic, with a shortly pointed tip.

Corolla tube about 3.5 cm. long, slightly curved, inflated for nearly half its length and constricted at the middle of the inflated part.

The upper part of the tube opens into a throat about 2 cm. wide. Colour greenish-white, spotted with purple on the outside. Lobes 1 to 1.4 cm. long, triangular, replicate, bulging outwards, set with short hairs on the inner surface, while the edges are set with longer, club-shaped hairs. The tips of the lobes are fused.

Inflorescence two- to three-flowered, axillary, from a common peduncle 1 to 1.2 cm. long.

The distribution of this plant appears to be comparatively wide: it is recorded from the coral cliffs south-east of Mombasa Island in Kenya, from the Kavala Islands in Lake Tanganyika, from the mouth of the Pungwe River in Portuguese East Africa, and from Elisabethville in the Belgian Congo. (Plate 46, Fig. 2 with immature flowers.)

Ceropegia Brownii Ledger.

Closely related to *C. mozambicensis* with which it shares the characteristic constriction of the basal part of the tube, this species has much larger flowers with erect (not bulging) corolla lobes and other differences. It was collected by E. Brown in the Mabira Forest in Uganda.

Ceropegia sp. nr. *C. Brownii* Ledger.

(Coryndon Museum No. 7933.)

A trailing plant with lanceolate, fleshy leaves, 2.5 cm. long and 8 mm. wide.

The flowers are produced singly from the leaf axils on a peduncle 1 cm. long, but which continues to grow—as the fruit develops—to 1.5 cm.

The corolla is 3 cm. long, with a slightly curved tube and a swollen, constricted base. At the throat the tube widens abruptly. The triangular, erect lobes are coherent at the tips. The colour is greenish-white, flecked with purple. The lobes are pale green, with purple tips and edges, the green parts with purple spots which become denser towards the throat.

The edges and the inside of lobes and throat are set with purple hairs.

The plant occurs near Kibwezi, at the foot of the Chyulu Hills, Kenya Colony, at 3,500 feet altitude. (Plate 46, Fig. 3.)

Ceropegia denticulata K. Schum.

Stems twining, fleshy, glabrous. Leaves subsessile or shortly petiolate, 3.5 cm. long, 10 to 12 mm. broad, fleshy, ovate or sub-rhomboidal, tapering at both ends and denticulate at the apex. Peduncle two-flowered.

Corolla about 4 cm. long, whitish, with blackish-maroon spots, glabrous outside. Tube 3 cm. long, moderately inflated at the base. Mouth broadly funnel-shaped, 10 to 20 mm. in diameter, ciliate. Lobes 10 mm. long, linear, erect, connate at the tips, pubescent, ciliate with long, vibratile, clavate hairs.

The plant is related to *C. mozambicensis* and to *C. Brownii*, but the inflated part lacks the constriction.

It was collected by Holst in Silai, in Tanganyika Territory.

Ceropegia sp. nr. *C. denticulata* K. Schum. (Bally S45.)

The main feature which distinguishes this plant from the former is the greater length of the corolla lobes which measure 1.5 to 2 cm.

This, however, may be a variable character, and more material is required from the type and other localities to settle this point.

The colour of the corolla varies from an almost uniform green, with a band of maroon across the lobes which have purplish-maroon edges and purplish-maroon vibratile and clavate hairs, to a dense maroon mottling over the entire surface of the tube.

The plant is one of the most attractive ceropegias.

It is a very common climber over bushes in the rocky river-beds near Nairobi, and in the forests of Langata, Karura, and Ngong, between 5,400 feet and 6,000 feet altitude. (Plate 46, Figs. 4 & 5.)

Ceropegia sp. nov.? (Bally S48.)

A scandent herb with a flat, disc-shaped tuber to 5 cm. in diameter.

From the tuber a single stem is produced, erect in the young plant, but assuming a semi-scandent habit if given support. Stems slender, not fleshy.

Leaves rhomboid, mucronate at both ends, very fleshy, shortly pedicellate, 2.5 cm. long and 16 mm. broad. One to two flowers are produced axillary on short peduncles, 2.5 mm. long.

Corolla 16 mm. long with globose swollen base, 5 mm. wide. The curved tube is 5 mm. long and 2 mm. wide, spreading at the throat to 5 mm. The narrow lobes, edged with vibratile hairs, are 4 mm. long and cohere at the tips.

The inner wall of the corolla base is set with rows of very small blister-like glands. Numerous minute Diptera were found trapped inside.

The outer corona lobes form an almost perfect cup with an undulate margin, 1 mm. high. The inner corona lobes are erect, linear, curved outwards at the tips, 2.5 mm. long.

The plant was discovered by Mrs. H. Copley in Nairobi, Hill District, on black soil, 5,400 feet altitude, in June, 1940. (Plate 47, Fig. 6.)

Ceropegia sp. nov.? (Bally S83.)

In habit very similar to the plant described above, it is readily distinguished by the linear leaves, reduced to scarcely more than the fleshy midrib. The stems, erect when young, later become trailing and sparsely branched; but are rarely more than 45 cm. long.

The inflorescence is axillary; from a peduncle 10 mm. long five and more flowers are produced consecutively.

Corolla 24 mm. long with spherically inflated base, 5.25 mm. wide. The curved tube is 2 mm. wide, opening into a throat 5 mm. wide. The replicate, narrowly triangular lobes are 5 mm. long and cohere at the tips. The inner edge of the lobes and

the inner surface of the tube are covered with very thin vibratile hairs. The swollen base is glabrous.

Base and lower part of tube are greenish-white with faint maroon spots.

The throat is dark maroon, the lobes green, tipped with maroon.

The corona is 3 mm. in diameter. The outer corona lobes are spatulate, slightly pointed in the middle and flanked by two very short horns; the inner lobes are erect, 2.5 mm. long. In the mature flower, the inner lobes spread outward. The corona is white.

The plant is common in Onjiko near Kisumu, Kenya Colony; it is called "ongei" by the Luo, who eat the tuberous roots. (Plate 47, Figs. 7 & 8.)

Ceropegia seticorona E. A. Bruce. (Coryndon Museum No. 7319.)

A climbing plant with slightly fleshy leaves. This species is characterized by the long peduncle at the apex of which five to eight long, pedicellate flowers are borne. The corolla has a cylindrical, slightly curved tube, scarcely inflated at base and throat. The lobes are very slender, coherent at the tips and giving the appearance of a bird's beak. The outer corona lobes are forked, the two horns being broadly triangular and spreading, tipped with one or two long bristles (the "bristle-coronaed" *Ceropegia*) and thinly hairy at the base.

The inner lobes are much longer, narrowly linear and hooked at the tips.

The corolla is of a nearly uniform pale green.

The plant was discovered by the writer near Namanga, on the Kenya-Tanganyika border, at 3,600 feet altitude, in *Commiphora* bush, in April, 1938.

Ceropegia sp. nr. *C. seticorona* E. A. Bruce. (Bally S74.)

This climber differs from *C. seticorona* by the fleshier and entirely glabrous leaves, the slightly larger flower which is greenish-yellow, flecked with maroon along the tube, and has uniformly maroon lobes.

The narrow portion of the tube is covered inside with a fringe of pink hairs. The corona shows no marked difference from that of *C. seticorona*.

It was discovered by Mrs. Joy Bally in Kasindi, Belgian Congo, in December, 1939. (Plate 47, Fig. 9.)

Ceropegia sp. nov.? (aff. *C. seticorona* E. A. Bruce). (Bally S72.)

This fleshy climber is closely allied to the above species. Its corona with bifid, outer lobes set with sparse, stiff bristles and with its slender, long, inner lobes resembles *C. seticorona*.

The fleshy leaves are slightly lobed at the base; they are to 4 cm. long and 3 cm. wide, on a stout pedicel about 1.5 cm. long.

The corolla is 3 cm. long with a curved tube and a spherically inflated base. The corolla lobes are deeply cut, about 1.5 cm. long, replicate and rounded at the tips. The tips are coherent. The inner surface of the lobes and of the upper portion of the tube are covered with short, bristle-like hairs. The colour of the flower is described as greenish-yellow to buff.

The plant occurs in the Garabani Valley near Sultan Hamud in Kenya Colony, at 4,500 feet. It was discovered by Dr. V. G. L. van Someren in March, 1940. (Plate 48, Fig. 10.)

Ceropegia stenantha K. Schum. *var. parvifolia* N. E. Brown.

This very graceful *Ceropegia* is a climbing plant with long, linear, slightly fleshy leaves. The delicate flowers grow in umbels. The corolla tube is curved with a slightly swollen base. The lobes are linear, sharply replicate, separated from their base and coherent at the tips. The length of the corolla is 3.5 cm. The colour is green.

The outer corona consists of five small pouches alternating with the anthers. The inner corona lobes are erect, 1 mm. long.

The variety has a fairly wide distribution; it is recorded from Rhodesia and from Tanganyika Territory. In Kenya Colony, it occurs at the foot of the Chyulu Hills, at approximately 4,000 feet altitude, where it was collected by the writer. (Plate 48, Fig. 11.)

Ceropegia succulenta E. A. Bruce.

One of the showiest East African ceropegias. It is a large-flowered, succulent climber with oblong-elliptic, fleshy, variegated leaves.

The pedicellate leaves are to 6 cm. long and 4 cm. wide. They are glabrous, shiny, dark green with pale whitish-green veins.

The corolla is to 6 cm. long, much inflated at the base, then abruptly contracted into a narrow tube and finally widely expanded at the throat.

The lobes cohere at the apex; they are more or less triangular in shape and folded back so that the margins nearly touch.

The inflated base and tube are ivory white dotted with circular maroon spots. The lobes are greenish, edged with maroon and covered with minute maroon hairs.

The corona is cup-shaped at the base and thinly puberulous, the outer lobes are deeply bifid and rather shorter than the entire inner ones.

This beautiful plant was discovered in Kiambu, at 5,400 feet altitude, by Miss Evelyn Napier, formerly Botanist at the Coryndon Museum. It has since been found to be common in other forests in the neighbourhood of Nairobi. (Plate 48, Fig. 12.)

Ceropegia sp. nov.? (aff. *C. succulenta* E. A. Bruce). (Bally S70.)

Although very similar in habit as well as in the flowers, the growth of this plant is more robust, the leaves are slightly larger, and the corolla measures to 7 cm. in length.

The corolla lobes are considerably longer, linear towards the tips and curved to one side.

The base is compressed globose, with the narrow tube sunk into it.

The colouring is similar to that of *C. succulenta,* but the purplish-maroon spots on the tube are smaller, and the lobes are tipped with dark maroon.

The outer corona lobes are more deeply bifid and slightly shorter than those of *C. succulenta.*

It was collected by Dr. V. G. L. van Someren on Emali Hill near Sultan Hamud, Kenya Colony, at 5,500 feet altitude, in March, 1940. (Plate 49, Fig. 13.)

Ceropegia sp. nov.? (Bally S44.)

The erect, non-scandent habit of growth, the very narrow openings between the corolla lobes and the short inner corona lobes are distinctive in this species.

It is a much-branched plant, about 30 cm. high with a tuberous root. The stems are fleshy, to 6 mm. thick, the internodes 1 to 1.5 cm. long. The linear leaves are fleshy, up to 8 cm. long and 7.5 mm. wide with slightly wavy margins.

The inflorescence is axillary and consists of few-flowered racemes to 4.5 cm. long.

The corolla is 18 mm. long, slightly inflated at the base, the tube 3 mm. wide, expanding to 7 mm. in diameter at the throat. The rounded corolla lobes are only slightly replicate, leaving a narrow, slit-like opening between them; they are 4 to 5 mm. long and cohere at the tips. The corolla is glabrous outside; the inner surface of the lobes and of the non-inflated part of the tube is set with minute, bristle-like hairs.

The corona is 2.25 mm. in diameter. The outer lobes are rounded, with two much-reduced horns, minutely puberulous. The inner lobes with a length of 0.75 mm. just subtend the staminal column. Corolla and corona are green.

This interesting plant was discovered by Mrs. K. Armstrong in Kiambu, Kenya Colony, at 6,000 feet altitude, in March, 1941. It occurs also in Nairobi. (Plate 49, Fig. 14.)

TRIBE: *CYNANCHEAE.*

Out of the twenty genera included in this tribe, only two need concern us.

Genus *Cynanchum.*

Only one succulent species is known from East Africa.

Cynanchum sarcostemmatoides K. Schum.

As indicated by its name: the "fleshy-festooned" *Cynanchum,* this plant is a twining, succulent, climber which grows over bushes and forms festoons over their branches.

From a fibrous rootstock sparse ascending and trailing, much-branched stems are produced. They root readily at the nodes.

The branches are 1.5 to 3 mm. thick with nodes up to 15 cm. apart. Leaves scale-like, 3 mm. long and 1 mm. wide at the base, soon deciduous.

The flowers are produced in few-flowered umbels from sub-lateral tubercles. They develop in sequence and as a rule no more than two or three flowers mature simultaneously. The pedicels are stout, glabrous, 2 to 3 mm. long.

The five-lobed corolla, reflexed in the mature flower, is green, streaked with maroon; the corolla lobes are 5 mm. long and 1.75 mm. wide at the base.

The five-toothed corona is bell-shaped with the teeth subtending the staminal column; it is 2.35 mm. wide and 1.8 mm. high and pure white in colour.

The plant is found all over East Africa under dry conditions from sea-level up to 5,000 feet altitude. (Plate 49, Fig. 15.)

Genus *Sarcostemma.*

The members of this small genus are fleshy-stemmed, leafless plants of bushy or climbing habit and resemble some species of *Euphorbia.*

The F.T.A. (1902) records only two species, but it suggests that more species may exist and that study of the living plants might show up specific differences which are not evident in herbarium material.

Observations of plants in the field and in cultivation in Nairobi have indeed shown that—although the structure of the flowers is remarkably uniform—in habit at least four well-defined species occur in East Africa.

Sarcostemma viminale R. Br.

A many-stemmed, scandent shrub with tuberous roots and with numerous slender, whip-like stems which trail or climb over bushes. The branches are dark green, glabrous, turgid with a white latex. They are 5 to 6 mm. thick at the base, the young shoots 2 mm. thick or less. The nodes are 15 cm. or more apart. Stems trailing along the ground root at the nodes.

The leaves are reduced to very minute scales which are soon deciduous.

The stems are sparsely branched; unforked branches are often 100 cm. or more in length.

The flowers are produced in sessile umbels, terminal, or lateral at the nodes. They are pedicellate, the pedicel 5 to 6 mm. long, slightly puberulous.

Thirty or more flowers have been counted on one umbel.

The five-lobed corolla measures about 18 mm. in diameter; it is greenish-white to sulphur-yellow, with its lobes more or less reflexed at the margins.

The outer corona is cup-shaped with a wavy margin; the inner corona consists of five erect lobes, compressed at the base and with pointed tips, adpressed against the backs of the anthers. The corona is pure white.

The flowers are very sweetly scented.

The distribution of *S. viminale* is very wide. It is found on dry rocky ground and on sandy soil all over East Africa, from sea-level to about 6,000 feet altitude. (Plate 50, Fig. 16.)

Sarcostemma sp. nr. *S. andogense* Hiern.

(Coryndon Museum No. 6621.)

In habit similar to *S. viminale,* this plant is much more robust in all its parts. Fresh stems are 10 to 12 mm. thick, with their nodes 12 to 15 mm. apart. The terminal shoots are 3 to 4 mm. thick. The growth is stiffer and more straggly. The surface of the stems is a pale, glaucous green and it is covered with a creamy-white tomentum which is noticeable particularly on young shoots. The flowers are slightly larger in diameter, but so similar in structure to those of *S. viminale* that a specific differentiation is hardly possible. They are disposed in pedicellate, terminal, sometimes lateral, many-flowered umbels. They are greenish-white in colour and sweetly scented.

The distribution of this species is wide in Kenya Colony and in Tanganyika Territory, but it is confined to lower altitudes and drier localities than is the case with *S. viminale*.

Sarcostemma sp. nov. (Coryndon Museum No. 4051.)

This plant can be readily distinguished by its short, tufty growth which gives it the aspect of being continually browsed back by cattle. The fresh branches are 8 mm. thick, terete, with the nodes set very close, 1 to 3 cm. apart.

The terminal shoots are 1.5 mm. thick. The numerous stems which are produced from a fibrous to tuberous rootstock are much-branched and covered with a very slight greyish-white tomentum.

The trailing branches root readily from the nodes and soon develop new plants, one plant soon covering an area of a square yard or more.

The flowers are produced in terminal and in lateral umbels of numerous, pedicellate, sweetly scented flowers. The corolla is reddish-brown, tinged with green with its five lobes sharply reflexed. The corona, very similar to that of the foregoing species, is pure white.

The plant is common in the Kenya Highlands on rocky ground and in pasture land on well-drained soils.

It was first collected by Mrs. Brodhurst-Hill in the Soy District, at 5,000 to 6,000 feet altitude. (Plate 50, Fig. 17.)

Sarcostemma sp. nov. (Bally S46.)

The smallest and the most delicate of the East African species, it produces only a few, tin, sparsely-branched stems and a weak, fibrous root system.

The branches are 3 to 4 mm. thick with the nodes 4 to 7 cm. apart. They are of erect habit until they are more than 15 cm. high, when they develop a procumbent habit, and root at the nodes. They grow seldom more than 30 cm. long.

The inflorescence consists in lateral umbels of four to seven flowers.

The corolla is 10 mm. in diameter with lobes 3.5 mm. long, replicate, and of a vivid mauve.

The outer corona is cup-shaped, 1 mm. high and it encloses the inner corona more tightly than it does in the species mentioned before.

The inner corona lobes are not compressed at their base.

The attractive little plant was discovered on Lion Hill in the Serengeti Plains in Tanganyika Territory, by Dr. W. Klett, in 1935. It has since been found on rocky outcrops in the bottom of Ngorongoro Crater, and in Kenya Colony near Stony Athi, at 5,000 feet altitude, on black soil and on Mt. Susea, 5,500 feet, on old lava flows. (Plate 51, Fig. 18.)

This concludes our account of East African succulent *Asclepiadaceae*.

(TO BE CONTINUED)

SOME NOTES ON THE EARLY HISTORY OF THE TRIBES LIVING ON THE LOWER TANA, COLLECTED BY MIKAEL SAMSON AND OTHERS.

WITH AN INTRODUCTION BY

R. G. DARROCH.

INTRODUCTION.

It is hoped that the attached papers, (1) "A History of the Malachini"—or Lower Pokomo—by Mikael Samson, a Pokomo of the Buu sub-tribe, and (2) "The Story of Liongo" by Arabs and Swahilis of Kau and Kipini, may be of interest as the original work of Arabs and Africans. Both were entirely unsolicited on my part.

The story of Liongo appears in Steere's *Swahili Tales*. So far as I recollect his version is much the same as that given here, except that this one includes parts corroborating Mikael's *History*. The version here was compiled largely from written records.

Mikael's *History* is admittedly scrappy. To put it into strict chronological order is impossible, since, in fact, several sub-tribes claim to have been the first on the Tana. Actually different men may well have reached it more or less simultaneously, and lived there in ignorance of each others' proximity. The Arab story corroborates the Buu claim, but even it may only mean that Sango was the first to meet the coast people. A story given me by the Gwano also corroborates the Buu claim, but gives an entirely different account of how the first meeting occurred, to what Mikael has written. I do not give their story in full because they are not Malachini, and secondly, I want the paper to be Mikael's and not mine. With considerable diffidence I have appended a few notes, which may perhaps help to throw Mikael's story into perspective.

I can offer no comments at all on the relationship between Buu, Giriama, Segeju, etc. Undoubtedly, the Pokomo are of mixed origin, as in fact Mikael shows. His remarks may perhaps interest someone who does know Giriama traditions.

I have made a rough sketch map which shows most of the places mentioned. The rest can be guessed approximately from descriptions of how they compare with named places. To sketch in the various river-beds would require a very large map, and very accurate survey. The Tana basin is a mass of them all the way down, especially below Mwina, where large areas are flooded annually.

TRANSLATION.

Kipini.
18th October, 1941.

THE DISTRICT COMMISSIONER,
R. G. DARROCH, ESQ.

I have the honour to bring you these notes about the Malachini tribes from their origin and where they came from, as the old men tell.

I have been working on this since 1930, when I was a Hut Counter at Bura, N.F.P. Every time I went on leave I talked with the old men of the Buu tribe of this and that to ask about the origin of the tribes, especially the Buu.

At first, I gave the notes to the Missionaries at Ngao, and they were very pleased with them and promised to put them in a book for children at school, but they were prevented by the war.

The man who helped me most was Headman Pwongwa of Ngao. Another man admitted to know the old events was an old man called Kode of Marembo. Both are now dead.

I could not write about the upper Pokomo, except a little about the Ndera and Gwano.

I bring you this and hope you may like to use some of it and I ask you to preserve it.

(Signed) MIKAEL SAMSON KIRUNGU,
Registration Clerk.

(NOTE.—This is dated October, 1941, but was actually given to me in August, 1942.—R.G.D.)

HISTORY OF THE MALACHINI TRIBES.

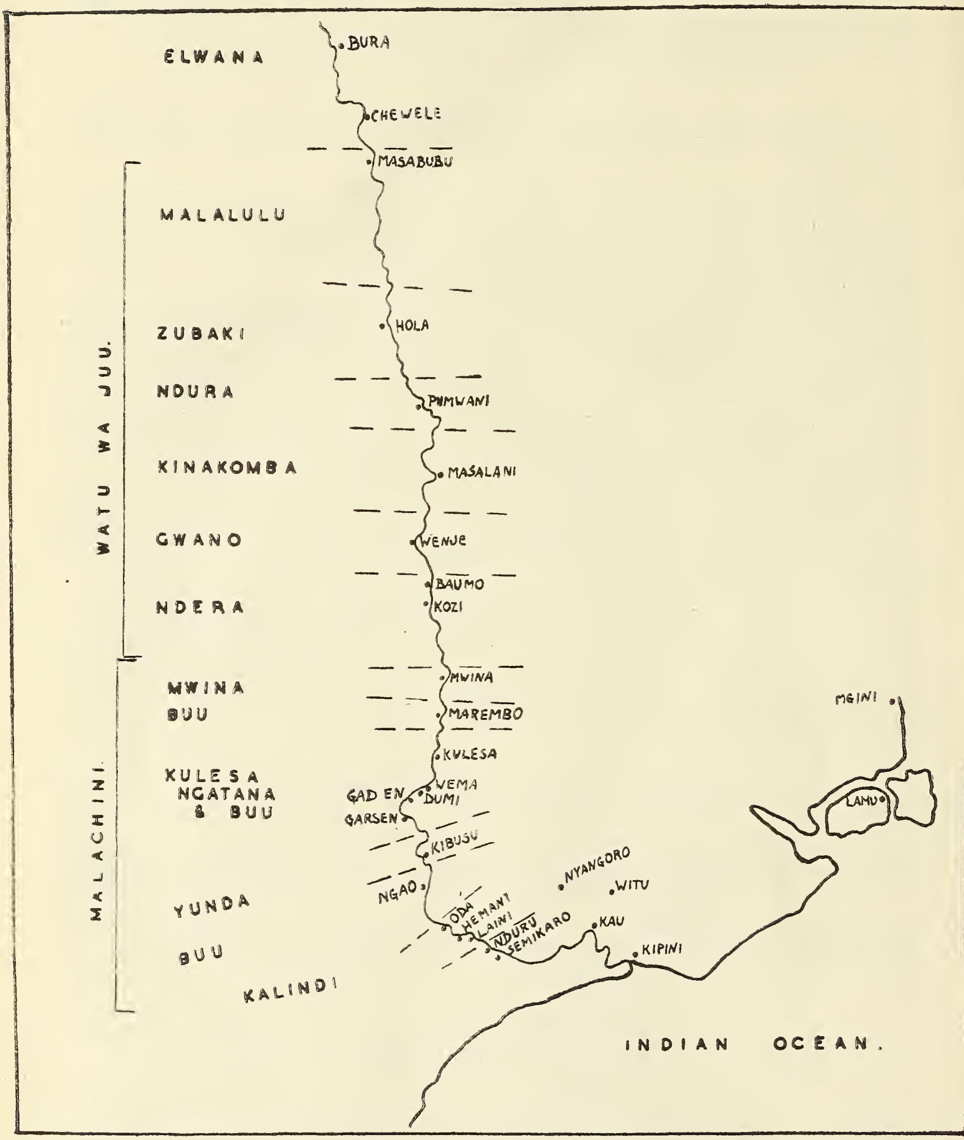
Malachini is the name used by the Upper Pokomo, but they (the Malachini) call themselves Pokomo, and they call the people from Ndera to Malalulu "Watu wa Juu."

Also the Malachini are not one tribe only, and their origins are different. There are six Malachini tribes:—

(1) Mwina.
(2) Kulesa.
(3) Ngatana.
(4) Dzunza or Yunda.
(5) Buu.
(6) Kalindi.

These are the Malachini tribes, but they all have one language and it is the language used in all the Mission books.

Now I will explain the origin of each tribe, and the country whence it came. All these words are as the Buu elders tell.



Sketch Map to illustrate Mikael Samson's *History of the Malachini.*
The names of the tribes are given on the left.

Some people of these tribes would not agree with part of them, especially the parts they do not like, but they are true and no one could get more correct information without writing rubbish.

Sango Vere—Ancestor of the Buu Tribe.(2)

The Buu tribe is the most numerous of all the Malachini. They themselves say their ancestor Sango Vere came from Mungini or Mundini, in the country called Inti Kuu (Lamu District). Even now there remain Swahilis called Pokomo of Mungini. The Buu say they are the ancestors of these people. Others say the Pokomo of Mungini originally came from the Tana. But the truth is that Sango Vere, ancestor of the Buu came from that country and reached the Tana near Nyangoro and Mawa. He arrived there alone without wife or child.

Sango Vere journeyed up river as far as Gwano, without meeting anyone. On a second journey he reached a lake called Lemu near Baumo. There he met the ancestor of the Gwano. On his way back he met no one in Ndera except the Mwina. They accompanied him to Kaloni, between Gaden and Wema. They divided the country, the Buu from Kaloni downwards and the Mwina from Kaloni up to above Kozi in Ndera.

Kalindi—Sango Vere's Journey Downstream.(3)

Then Sango travelled downstream to the Lake Gana (now Matamba) below Garsen. There he met Liongo Fumo, who always went to that lake to wash his clothes. Sango and Liongo became friends and went together to Shaka where Liongo's village was. On the way they met no one on the river.

Sango then returned to Buu country. Their friendship continued and Sango often went to visit Liongo, but every time he passed through Chara there were no people there.

Then Sango and Liongo quarrelled and fought, and Sango was beaten. From that time Liongo made Sango pay tribute, every year one girl, and Sango paid. Later generations refused this tribute, and it was changed to a tribute of food, and they paid it till Government came.

Origin of the Kalindi.(4)

Before Sango was lost he went to Liongo at Shaka, and saw people like himself, speaking the same language. Sango made an arrangement with Liongo that these people should follow him to the river, to live with him and cultivate and help to pay the

(2) The numbers refer to notes beginning on page 250.

tribute. Liongo agreed and gave him these people. They followed him to Semikaro and Oda, and later as far as Ngao which was then uninhabited. They divided the country: from Ngao downwards to belong to the Kalindi, and above Ngao to the Buu. The descendants of these people live at Oda, Hemani, and Laini now, but they are not many, and even half the inhabitants of those villages are Buu.

The meaning of the name Kalindi is that they lived in holes. They often hid themselves in holes in their shambas when danger threatened. Therefore, the Swahilis called them Kalindi.

(NOTE.—According to Miss Werner "Dindi" means a hole where fish lie.—R.G.D.)

The origin of these people is not known properly, nor whence they came, but we can guess they were Swahilis (i.e., from the Coast) and that their origin is Bantu. By law they ought to rule the country of Chara, because all other Pokomo in that Location came from up-river, but they were there originally.

ORIGIN OF THE NGATANA.(5)

It is said that the Ngatana were originally Wata, who came to the river in Zubaki country. Then they stole and were beaten and one woman was killed at a place called Hancholoko. The Wata ran away to Mwina country and settled there as guests of the Mwina at Wema. Later they were called Ngatana.

ORIGIN OF THE KULESA.

The Kulesa are not Ngatana. Their origin is Elwana (Malankote). They fought among themselves and perhaps two of them ran away and became guests of the Mwina. The Mwina gave them a place among the Ngatana, and they live there even now. The Kulesa and Ngatana have now combined to form one tribe because they are not numerous. Even the Elwana agree that this is a true account of the Kulesa, and their Headman Bukuro Guyo showed me the village whence they came near Chewele.

BUU AND MWINA.

Then the Ngatana and Kulesa increased and the Mwina decreased. They fought many times and the Mwina were beaten. When they beat them the Ngatana cut skin from their buttocks and rubbed ashes on the sore places. Even now people call the Mwina "Ba Nyonga" (from "pala" to skin and "nyonga" the rump), meaning people who have had skin cut off their buttocks. It is a term of contempt.

Seeing themselves oppressed the Mwina went to the Buu and asked for men, and the Buu sent men from every family, and the Mwina gave them land among the Ngatana. There are Buu at Marembo even now. Their agreement with the Mwina was that they help the Mwina if the Ngatana attacked them. After that the Mwina lived in peace because the Ngatana were afraid of the Buu.

Quarrels of the Buu and Ngatana.(6)

(*a*) The Ngatana married a Buu woman and the Buu gave them a piece of land for this woman to cultivate from Kaloni to Mbewee. Mbewee is above Dumi and Kaloni is above Gaden.
(*b*) Also there are two lakes near Gaden called Mumbo. One belongs to the Buu and the other to the Ngatana.
(*c*) Behind the lakes is the forest of Mihaja. The Buu and Ngatana quarrelled about it, and in 1941 it was given to the Buu.
(*d*) There is a village, the last Buu village, called Muryikicha near the Mihaja forest.

The Ngatana often fished in the Buu lakes and the Buu were fierce. They often fought especially at a place called Lolani (Lola is the Oromo for war.—R.G.D.) above Dumi, with fists and clubs before the Buu left that country.

Dzunza or Yunda.

This tribe has always been very small and their country is on the old river east of Kibusu. From long ago some of the Buu lived above them and some below. They were in the middle. From old times they were under the protection of the Buu so that other Pokomo tribes could not oppress them. When the old river dried up they and the Buu came to the new river at Kibusu and they are still there.

The Buu say the old river to which Sango Vere came is the Magogoni, which is to be seen at Kau. Following up that river you come to Gambi, Mawa, Mwanapaka, and Ashaka Matolo. Then you pass through the forest at Nyangoro towards Garsen, where you can now see a channel. The Buu call this river Milaoni (Mila means custom.—R.G.D.). Sango Vere reached it near Mawa. They say the other Malachini were never on that river.

Then that river dried up and the river was the Ntumba ya Mudando on the plain near Gaden.

Then it dried up and the river was the Mbewee between Dumi and Gaden, which flowed to above Ngao, to a place called Galana Duesa (means the dead river.—R.G.D.). We believe that river dried up about 70 years ago, because there are people still living who were born on it.

When that river dried the Buu had nowhere to cultivate and were forced to move to the new river, but from Ngao to Kibusu the new river went through one lake Ashaka Babo, and above Kibusu there was a lake called Gana or Matambo. Their Chief Buko Doyo came to Ngao with many of the Buu who were under him, and a few went up to the Buu of Mwina, that is to say to Benderani. From Ngao downwards it is the old river where the Kalindi live.

Buu and Giriama.

The Buu say that there were originally no Oromo. Then the Oromo came and fought them very much. The Buu were beaten and decided to look for country. Many of them ran away by way of the hill of Gede. Those Pokomo who ran away were called Sagidzo. Possibly they are those called Segeju who live in Tanganyika, because there is a page about them in a Swahili book called *Zamani Hata Siku Hizi*. It says the Segeju passed Malindi and met the Reno there. This book confirms what the Buu tell.

Then the Oromo attacked them more and more and others followed the route of the Segeju. These are the Giriama. Even the Giriama say their origin is Pokomo.

It is known that there are people called Shungwaya.(7) They live near Kismayu. Shungwaya are the Pokomo tribes who came from there, especially the Buu. So did the Giriama, Digo, Segeju, and other coast tribes.

The Buu also say that their origin is from Mungini, and there are people there now called Pokomo of Mungini. Mungini is the country of Inti Kuu. Perhaps the Buu came from Shungwaya, Kismayu, and Mungini, and came to the Tana and built Sangeju Mawa between Witu and Ngao.

The Giriama, Digo, Segeju, and others agree that they are related to the Pokomo. They say they came from Shungwaya. Of the Pokomo only the Buu have a tradition of Shungwaya.

NOTES ON ABOVE BY R. G. DARROCH.

(1) In translating I have used the names of tribes other than Pokomo, which those tribes use when speaking of themselves, e.g., Oromo, Wata, and Elwana, instead of Galla, Boni, and Malakote, the names generally used by Europeans, copying the Swahilis. I have also avoided use of the prefix "Wa" which is correct in Swahili, but not when using English.

(2) It is interesting to compare Mikael's account with that given me by Arabs and Swahilis of Kipini and Kau, and with articles by Miss Werner in *Journal of the African Society* of April, 1913, and *Folklore* of December of the same year. Miss Werner was told that Sango's father Vere was the first to reach the Tana and that Sango and three daughters, Mkabuu, Habune, and Habuya, were born here. The last two had only illegitimate offspring from whom some of the Buu claim descent. One would have expected all to trace from Mkabuu (called

Mke wa Buu by the Swahilis). Mikael had heard this version, but believes Habune and Habuya were Sango's daughters. The Swahilis say Sango had two sisters, Mke wa Buu and Nangowa, the latter being the first tribute girl handed to Liongo.

([3]) Liongo is mentioned in Steere's *Swahili Tales*. His village was Waungwana wa Mashaa, about a mile from Kipini, where his grave can still be seen. Some Pokomo say his mother was a Pokomo, but this is contradicted by Swahili tradition, which is almost certainly the safer to follow.

([4]) The tradition is that Sango (or Vere according to Miss Werner) was not born and did not die, he merely disappeared.

([5]) Some of the older Ngatana have given me an entirely different account. They say their ancestor Kanjala Dima (both Hamitic names) came from Kismayu—see Mikael's final paragraph—and reached the Tana before Sango, who arrived to find the Ngatana settled from Mtapani to Mwina, during Kanjala's lifetime. Mtapani (the place of Borassus palms) is on the main road about four miles east of Garsen, on what was then the main channel of the Tana.

Probably there is some truth in both accounts, since the Pokomo seem to contain a good many ingredients. The Ngatana clan names are Kidziwi and Bure, neither of which sound Hamitic, and the Wata are of Boran origin. Miss Werner gives a list of Pokomo clan names. Of these almost all the Malalulu and Zubaki ones are Boran. She says the "Deno" clan of the Buu is also Hamitic, but it is not a Boran clan name. Both Malalulu and Zubaki have a "Meta" clan, as have the Munyo (Korokoro) and Elwana (Malakote) of Garissa District, who say the Meta were slaves who escaped from the Oromo. The Zubaki admit to having a good deal of Kamba blood, probably derived in this way. Some of the middle Pokomo tribes (Ndura, Kinakomba, Gwano, and Ndera) say they are of Boran origin. Probably all these stories have some truth in them, though the Pokomo language is Bantu, with a number of Hamitic words, whose proportion increases as you go northwards. The Munyo (who speak nothing but Oromo) and Elwana (whose language is very like that of the Northern Pokomo) are not Pokomo, and dislike being called so, though they often are by Europeans.

([6]) The Buu-Ngatana quarrel exists today. It may have started as Mikael says over the woman's dowry, or it may be due to the alleged boundary at Kaloni—see paragraph headed "Sango Vere Ancestor of the Buu"—since if Kanjala Dima really settled the country from Mtapani to Mwina, the Ngatana would resent Sango's claim to the land from Mtapani to Kaloni. Both tribes have cultivation in this area now and no boundary could separate them, unless some of one or both be moved.

As to the dowry, this custom is still known, but not universal. It has, of course, nothing to do with the brideprice paid by the suitor. Such land descends through the children of that wife only, and is not like the rest of the holding of the husband's family.

([7]) There is a lake near Kibusu called Singwayu, which may confirm Mikael's belief that Sango came from near Kismayu, since it is quite near where Sango [and Kanjala, see Note ([5])] first reached the Tana. Mikael is wrong in saying that only the Buu have a tradition of Kismayu—see Note ([5]).

([8]) All the above notes are offered with considerable hesitation. I have only been in contact with the Pokomo for the last two years, when war-time duties gave little leisure for collection of information. I do know that the traditions of the Munyo and Elwana of Garissa District are very different to those set out by Mikael for the Malachini. His effort was entirely spontaneous so far as I know, and it is highly commendable that a comparatively young man should have taken the trouble to try to preserve the traditions of his elders.

TRANSLATION OF A LETTER WRITTEN BY ARABS AND SWAHILIS OF KAU AND KIPINI, TO THE DISTRICT COMMISSIONER, KIPINI.

SIR,

Please read these records of this country, you will understand the events of old time.

We give you the story of Shaka, whose King was Mringari of the tribe of Albauri, of the people of Ozi. He ruled Shaka from the year 121 from the Hegira of the Prophet of God.

Then Fumo Liongo came from the land of Jawa (Persia) and settled as an inhabitant of Shaka. He asked for a wife from Said bin Sheikh Ahmed Albauri, who gave him his daughter Somoe Mwana binti Said in marriage. She bore him a son who was named Liongo Fumo.

Liongo became a strong man, and the King and the people of the town loved him for his strength. Some time later disaffection arose, and some of the people told the King: "Understand he will take the kingdom from you." The King summoned the people for a dance called Gungu. Now Liongo was very expert at this dance, and went to the King's house and danced before the people.

He was seized and handcuffed, and was only allowed one loaf a day so that he might die of starvation in prison. His mother used to make a loaf and give it to a slave-girl, who took it to the door of the prison and gave it to the gaoler to give it to Liongo. After some time Liongo said to the slave-girl: "Greet my mother and tell her to make two loaves, one good one and one containing chaff, into which she can put a file."

His mother did so, and put a file into the loaf which had chaff in it, and gave both loaves to the slave-girl, who took them to the prison. When she reached the door the gaoler said: "Why have you brought two loaves? Every day he gets one only. Give them to me." She gave them to the gaoler, who took the good one, and returned the loaf with chaff in it to her saying: "Take this to your master in prison."

Liongo broke the loaf and took out the file. He then ate the loaf. When he had eaten it he sent the gaoler to the King to ask for the dance Gungu. The gaoler told the King, who gave the people of the town permission to dance the Gungu outside the prison door. When he heard the music of the Gungu, Liongo filed gently till he cut through the handcuffs. Then he broke the door of the prison and came out to join the dance. Everyone ran away for fear of him, and he went home.

After leaving the prison Liongo became King of the town, and the people sought other means to kill him. They ate dom palm nuts together (this makes an agreement binding everyone).

Each day one man climbed palms and gave the people nuts and they ate their fill. When everyone except Liongo had taken his turn, the people of the town said to Liongo: "Today it is your turn to climb." They meant to kill him if he climbed up. Liongo took his bow and shot an arrow and cut a branch of the palm, so that enough nuts to satisfy all fell down. Thus the plan to kill him failed.

Liongo realized that he was more and more in danger. Even when he wanted to wash his clothes he used to go to Gana, an old lake, because of the danger he was in. He used to go there on a Friday and wash his clothes and return the same day in time to pray at Shaka. Liongo was a very great man.

Soon after this the King died, but Liongo still went to Gana to wash his clothes. When many days had passed, he met a man followed by two women. Liongo asked: "Who are you?" He replied: "I am Sango Vere, and these are my sisters Nangowa and Mke wa Buu." They had come to Yunda and settled on the Sakutu river. Liongo agreed to let them live there. After a time Sango disobeyed Liongo's orders. They fought and Sango was beaten, and made to pay tribute. Sango handed over his sister Nangowa as tribute.

Nangowa was compelled to marry Bwana Mkuu, and bore him a son called Bwana Haji bin Bwana Mkuu.

Liongo killed the son of his stepmother Fatuma binti Bwana Hatibu Albauri. She when she married already had a son who was Liongo's stepson. The people of the town took counsel together and said to Liongo's stepson: "Ask your father what weapon can kill him." His stepson asked Liongo, who laughed at the boy and said to him: "You have been deceived. Understand you will be killed also. The weapon which can kill me is if a needle be driven into my navel, while I sleep."

The boy went and told the people of the town. They said to him: "Watch your father, and when he is asleep drive a needle into his navel. We will then make you King."

The boy watched his chance and drove a needle into his navel whilst he slept. Liongo jumped up with great strength, and took his bow, and went and knelt in the doorway for three days, with an arrow on the bowstring. He prevented those who were in the town from going out, or those who were out from coming back. The people went to Liongo's mother, and said to her: "We are starving, and thirsty. Tell your son to leave the doorway." Liongo's mother put on fine clothes, and went and took hold of her son. He fell down, and she returned to the town wailing. The people knew that Liongo Fumo was dead, so they buried him. After the funeral they took counsel together and said: "If you kill a snake you must cut off its head, lest it revive and bite you again. We had better kill the boy." So they took the boy and killed him.

The origin of the Kalindi. They are the remnant of the Pokomo of Mgini (Lamu District). They were defeated in war by the Kilio, and came to us at Shaka. We asked them: "Whence do you come?" They replied: "We have come from Mgini, where we were defeated by the Kilio, and ran away." The men of Ozi put them at Sada. Then the Oromo came and fought them and captured them, and took them to Mongo near the town of Gedi (Malindi District). Then the Ozi went to the Oromo and asked for the Kalindi. The Oromo demanded 400 dollars for them. The Ozi collected 200, and the Mungama 200, and they took the Kalindi and returned them to Sada. Sango Vere, the Pokomo, got completely lost. His sister Mke wa Buu went to look for him. She found him at Nduru, and told him that there were Pokomo at Sada. Sango said: "How will we get these Pokomo?" Mke wa Buu said: "Ask your brother-in-law. He will give them to you."

Sango went to his brother-in-law, who went with him to Sada crossing the river by the road of Bwana Shekiko. Sango saw the Kalindi and wanted to take them. The Kalindi said: "We are slaves of the Ozi. Go and ask them if you can take us." Sango went to the Ozi, and asked to be allowed to take the Kalindi, because the Oromo were distressing them. The Ozi said: "Take them so that they may help you in your work." Sango took them to the river and settled them at Mji Mkuu. The Kalindi said: "We are strangers. What will we eat?" Sango replied: "Eat what your spears provide, and what you can find in the bush."

Then the tribute of a girl was changed, and the tribute was one of food from Chadhoro to Mwina.

NOTES ON ABOVE BY R. G. DARROCH.

(1) Gana was a lake a little south of Garsen.
(2) Yunda is near Kibusu; it is the name of one of the Pokomo sub-tribes.
(3) Sada is about two hours' walk from Kipini, south of the Tana.
(4) Mji Mkuu is about an hour's walk south of Ngao, on the Tana.
(5) Nduru is on the Tana, at the extreme limit of the ten-mile strip.
(6) Chadhoro no longer exists. It was about an hour's walk above Nduru.

AFRICAN BEEKEEPERS: NOTES ON METHODS AND CUSTOMS RELATING TO THE BEE-CULTURE OF THE AKAMBA TRIBE IN KENYA COLONY.

By J. K. R. Thorp.

Author's Note.

These notes were compiled from information I obtained when I was stationed in the Kitui District in 1935-1936.

My debt to Lindbolm's *The Akamba* is apparent throughout, and I acknowledge it with gratitude. My thanks are also due to Mr. J. H. Driberg and Mr. K. B. Williams for their kindness in reading the manuscript and for much helpful criticism from the anthropological and bee-keeping points of view, respectively, and to my wife and Mr. P. Whiteing for preparing the diagrams for publication.

Being almost completely ignorant of both apiculture and anthropology, I am aware that I must have made many mistakes and I have probably drawn many false inferences. Bee-keeping customs, like other customs, vary considerably throughout Ukambani, and it is not pretended that this account of them is anything like complete.

It must also be added that the spelling of some of the Kikamba words might possibly cause a shudder from an expert.

J.K.R.T.

Marsabit,
Northern Frontier,
January, 1943.

"The Lord spake by inspiration unto the Bee,
Saying, provide thee houses in the mountains, and
In the trees, and of those materials wherewith men
Build hives for thee; then eat of every kind of fruit,
And walk in the beaten paths of thy Lord."

—(KORAN, Ch. XVI. Sale's Translation.)

The Akamba are one of the largest of the many tribes inhabiting Kenya Colony. Racially, they belong to the north-eastern group of the Eastern Bantu.

Their country, Ukambani, lies, approximately between 0°15′ and 3° south and between 37°15′ and 39° east. To the west the natural boundary is the ridge which slopes from the Kikuyu Highlands—Ulu, Yatta, and Kikumbulyu. To the south the boundary is the Athi River, and to the north and north-east the Tana (*Kiluluma*) River. To the east and south-east there is no definite natural boundary, and Akamba, Galla and the Nyika tribes intermingle. The present-day political boundaries are somewhat different, though following, in the main, the natural boundaries. The tribe is divided into two Administrative Districts, with Headquarters at Machakos and Kitui.

This country has two rainy seasons, one in November and December, and the other beginning in March and usually tailing off in May, though on occasions it may be prolonged to the end of June or beginning of July. The rains, however, are often irregular and may occasionally fail altogether, thereby causing severe famine. Nowadays, modern methods of transport and Government famine relief can, normally, cope with the situation, but in the famine of 1898-99, it was estimated that as many as 75% of the population must have perished in parts of the country.

We are, however, concerned only with bee-keeping, and in this connection the effect of these periodical droughts remains practically unaltered. Without rain there can be no flowers for the production of honey, and while it is true that the owners of hives are no longer wiped out wholesale by hunger, the fact that they must concentrate on procuring food to keep themselves and their families alive prevents them from attending to their hives. The result is that the majority of the hives containing bees fall a prey to roving bands of honey pirates, the empty ones fall to pieces for want of repairs, and the next season arrives to find only the fortunate few in possession of their full complement of beehives.

Every Mukamba is a bee-keeper; the possession of beehives is as an essential part of the tribal culture as is the possession of cattle and goats. As with these, the number possessed by an individual varies considerably—from one or two to one or two hundred. A Mukamba who takes no interest in bees (and there probably are a few) can be likened to an English public school boy who takes no interest in games—it is not done.

In a normal year, the honey season will be in full swing by the beginning of June. Hives are usually left in the trees during the whole season, and when the bees have filled a hive in the

first instance, honey will be extracted at intervals of six to twenty days over a period of one or two months, or longer, according to how long the bees can continue to make honey. Hives, however, may be taken down from the trees for removal to a more suitable site or to the village for repairs.

The bees, of course, are by now quite resigned to making their homes in the hives provided for their use and to losing most of their honey. Nevertheless, they still seek homes in hollow tree trunks, holes in rocks and so on, and to these retreats they are still followed by honey-seeking Akamba.

I.—Types of Honey-Bee Found in Ukambani.

The generic name for all bees is *nzuki,* although the usual reference is to the honey-bee proper which enters hives; this is the fierce black African wild-bee.

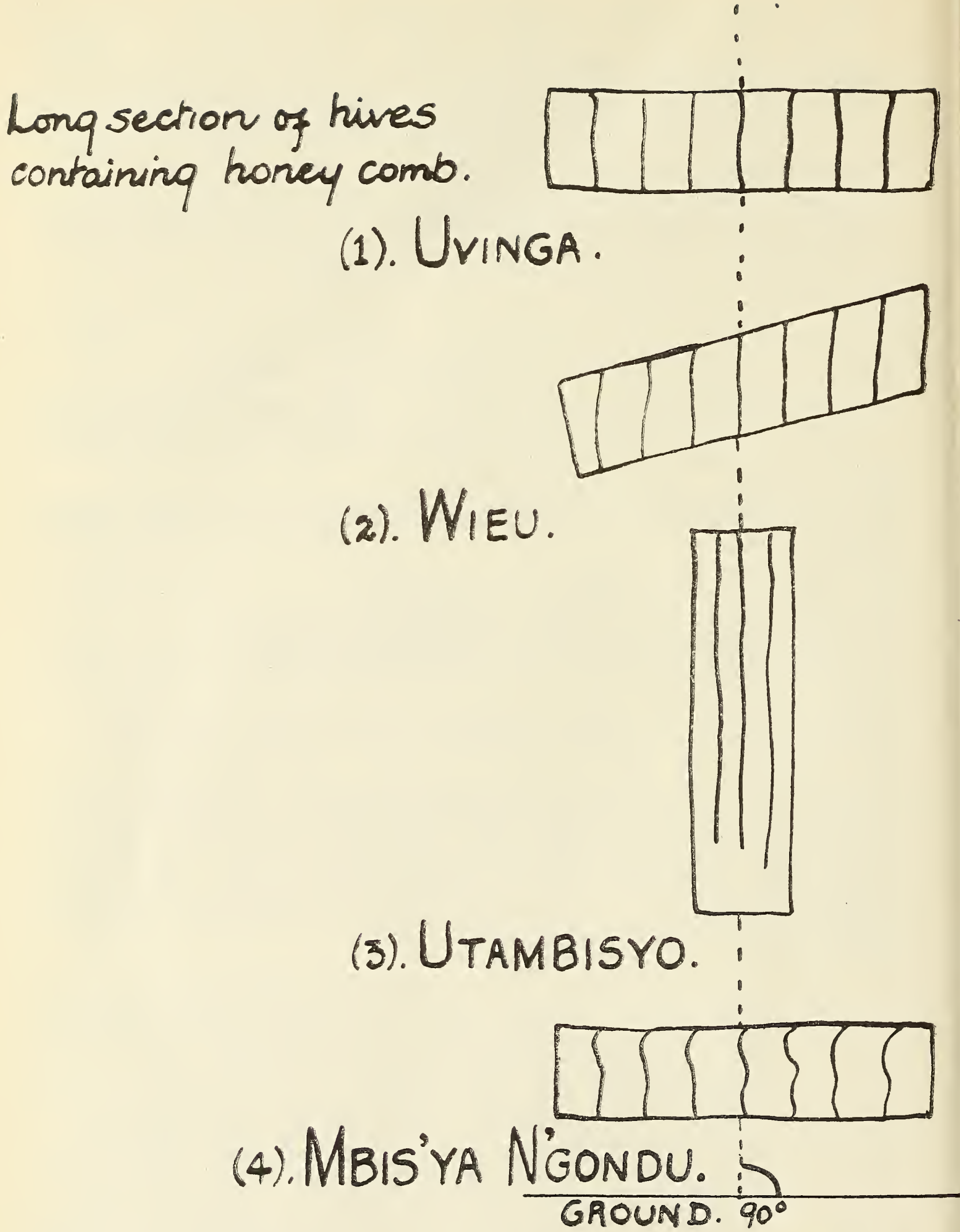
The composition of the hive is generally known, and named as follows:—

(1) *Inya*=the queen (i.e., mother).
(2) *Zaki*=the workers, recognised as females.
(3) *Ng'aa*=the drones, recognised as males.
(4) *Ebondu*=as far as can be ascertained, the young queens.

This bee is an excellent producer of both honey and comb.

Two other kinds of bee appear to be recognised by the Akamba, and the following descriptions of them have been given. They are said to be rather rare, and as no specimens could be collected for identification it is impossible to make any definite assertions concerning them. It may even be that they are not distinct species at all, but the same bee in different stages, or different sexes of the same bee.

(1) *Ngilu.*—A small dark bee, slender of body and of a very mild nature. Usually makes its comb in trees, but sometimes in the ground, and will occasionally enter hives. It is, however, a poor producer of honey, and is not regarded with favour by the bee-keeper. It does not try to make any permanent home like the true honey-bee.
(2) *Mbua.*—A small black bee, somewhat larger than a house-fly, which has no sting. It lives in holes in the ground in small colonies, where it produces excellent honey. Bee-keepers frequently try to procure some of its honey to put in empty hives, as it is said to possess great attractions for *zaki.*



NOTE ON (4). The diagram is supposed to represent combs having bulges caused by different sized cells etc. The name would probably be given in any of the other three instances should the combs be similarly formed.

TEXT FIGURE 1.

II.—Honey and Honeycomb.

The position of the combs in the hive will vary according to the angle at which the hive (see III below) is set. The four principal variations are named by the Akamba, as follows:—

(1) *Uvinga*	... ...	See Text Figure 1 (1)
(2) *Wieu*	... ...	See Text Figure 1 (2)
(3) *Utambisyo*	... ...	See Text Figure 1 (3)
(4) *Mbis' ya ng'ondu*	...	See Text Figure 1 (4)

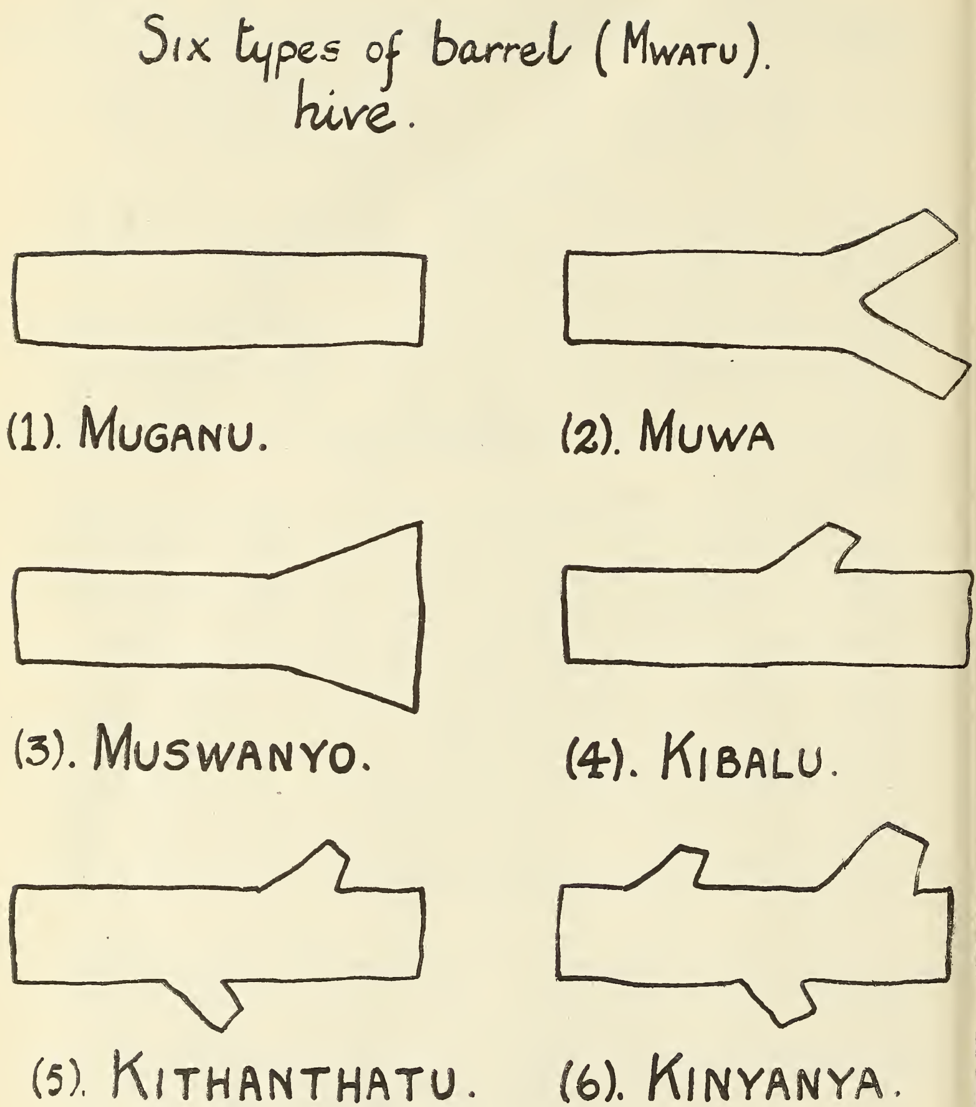
The best honey (*uki wa nzuki*) is made from a plant called *kiungu,* a creeper which has tendrils, tripartite leaves and red fruit. Other plants which are recognised as producing very good honey are *mwango, mwondo,* and *kasalu.* The list is by no means exhaustive. *Mwondo* is a species of Malva with a red flower, and *mwango* an acacia which has pale yellow or white flowers (Lindbolm). Akamba have stated that a good honey of a dark rich colour is produced from bullrush millet, the ordinary food crop of the country. This, however, has not been confirmed and is open to considerable doubt, seeing that it is a grass.

The bees are said occasionally to produce a poisonous honey, but I have been unable to discover its source. They do, however, very frequently make a very bitter honey from a species of rubber tree called *kiang'ati* or *kiaa,* which tastes not unlike quinine. A bitter tasting honey is also made from a thorn bush called *inyua* which is common in many parts of the country.

Honey and, to a lesser extent, honeycomb are popular as a food. For the men, the larvae are a delicacy, but they are not eaten by the women. It is also said that women should not eat honey when pregnant, it being believed capable of injuring the foetus. Honey is not usually sold to traders. Its principal use is for the making of mead, the drinking of which is a privilege of the old men (*atumia*): women, young men, boys and girls are forbidden to touch it. If, however, a young man can show that he has really "settled down" he may possibly be given permission to drink it

Honey, either in a raw state or, more usually, in the form of mead plays a large part in religious ritual. For example, unprepared honey is used for offerings to the spirits of the ancestors (*aiimu*) when rain or food is desired. Again, when a man dies honey from his hives is eaten by those taking part in the funeral ceremonies. Unless he had broached a hive shortly before his death so that the honey is actually ready, his hives must be opened in the first instance by a brother. (See X.—Inheritance of Beehives.)

In former days, the larger part of the honeycomb (*masoso*) was thrown away; some of it might, perhaps, be eaten, more especially in times of famine. The Akamba have gradually learnt



TEXT FIGURE 2.

that beeswax is valuable to other people, if not to themselves, and a considerable trade in this commodity has developed.

Honeycomb has a few other uses—for example, it is used for holding together the component parts of a *kithitu,* which is an instrument necessary for the taking of a special kind of oath.

III.—Beehives.

The Akamba beehive is the (in Africa) familiar barrel made from a hollowed-out log, and the generic name for such a hive is *mwatu.* It may vary in length from about a half to one metre. Six species of *mwatu* appear to be distinguished. (See Text Fig. 2.)

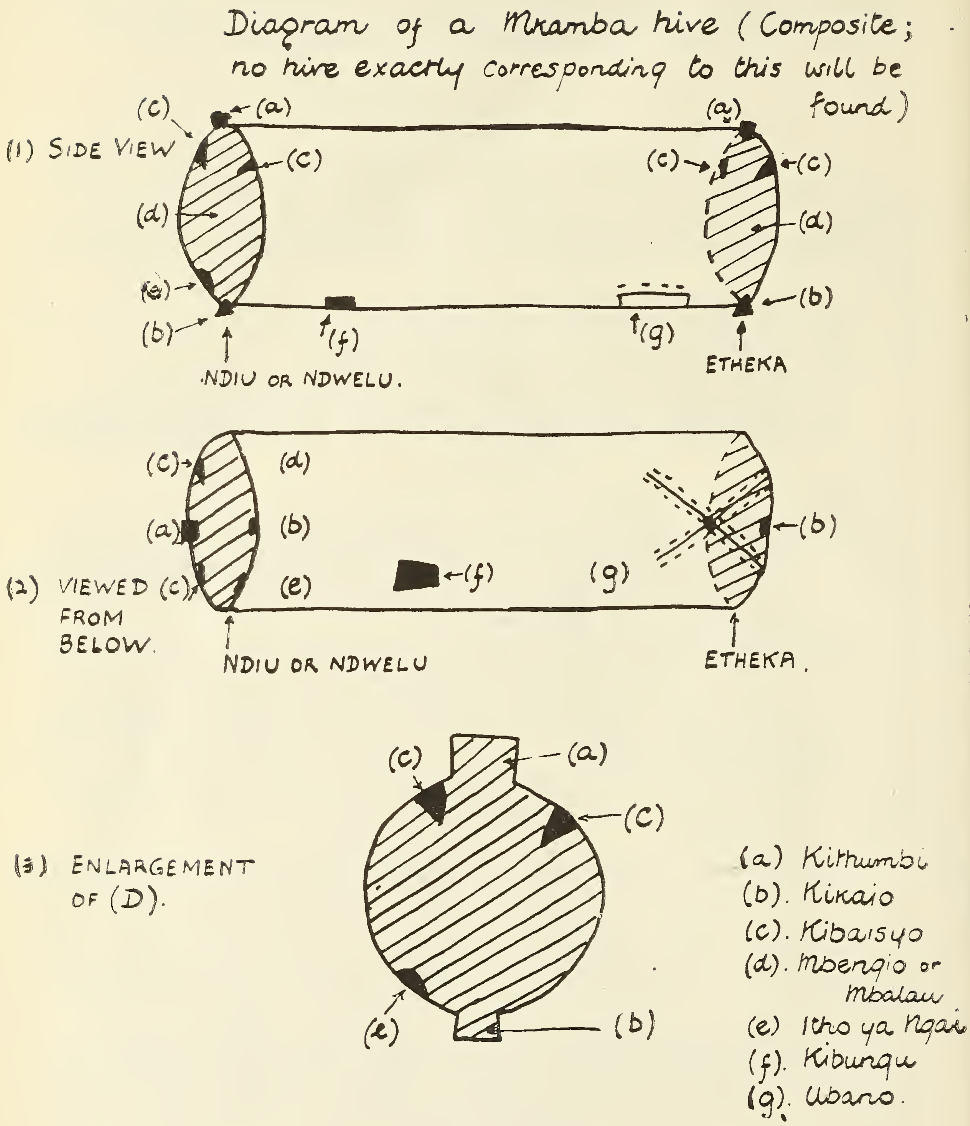
(1) *Munganu*=the single-barrel hive.
(2) *Muwa*=the forked-barrel hive.
(3) *Muswanyo*=the tapering-barrel hive.
(4) *Kibalu*=the single-barrel hive with one projection.
(5) *Kithanthatu*=the single-barrel hive with two projections.
(6) *Kinyanya*=the single-barrel hive with three or more projections.

Special trees are used for the construction of hives:—

(1) *Matula.*—This is usually considered the best, and among other good qualities it can withstand the onslaught of termites. The place name *Matulani,* "the place of the *matula* tree" is common.
(2) *Ilala.*—A palm tree found, especially, near the Tana, Athi and parts of the Thua Rivers. It has tough, stringy wood, and a hive made from it stands a good chance of remaining unbroken if it falls out of a tree. Probably the doum palm.
(3) *Mwongu*(?).—Possesses the qualities of (2) above. A hive made from this, Akamba say, may last for ten years or longer.
(4) *Kiumu.*—A wild fig, of which there are many other varieties in Ukambani. It is not so good as the other trees mentioned, but is serviceable and easily obtained.

These are the principal trees used in the construction of beehives. So far as can be ascertained, there is no customary obligation to use them and, if he is foolish enough to do so, a man is at liberty to make his hives of any other wood he pleases.

There is no particular class nor clan of beehive makers—anyone can make them, and indeed, it is part of a boy's education to learn how to do so. Nevertheless, in more recent times certain people have specialised in this work and earn their living by making and selling them.



TEXT FIGURE 3.

IV.—The Parts of the Hive.

The ends of the barrel are closed by flat pieces of wood which fit inside the rim. These may be fitted with holes for the entrance of the bees [see Text Fig. 3 (*e*)]. Frequently there is only one entrance and that in the middle of the owner's mark [see Text Figs. 3 (2 "g") and 4 ("x")]. The latter method would appear to be fairly common throughout *Ukambani*, though it has been stated to be peculiar to a certain clan living in Kikumbulyu in the south-west, on the Machakos side of the Athi River. (See Lindbolm's *The Akamba*, p. 494.)

The end from which the honey will be extracted is called *ndiu* (or in some places *ndwelu*), and the other end *etheka*. The end which will be opened is determined purely by common sense. If one end is a little wider than the other, for instance, it will probably be *ndiu*. At the opposite end, *etheka*, the owner will put his village mark (*ubano*), (see below). The actual lid is called *mbengeo* (or in some places *mbalau*). A hole by means of which the hive may be fixed to the tree is called *kibungu*.

The lid, *mbengeo* or *mbalau*, possesses the following parts [see Text Fig. 3, (3)]:—

(1) *Kithumbi*.—A projecting handle which fits in a groove, keeps the lid from twisting round and makes its removal easy. [Text Fig. 3, (3*a*).]

(2) *Kikaio*.—A smaller projection from the bottom. It fits in a groove and does not project like (1) above. [Text Fig. 3, (3*b*).]

(3) *Kibaisyo* (pl. *ibaisyo*).—Two wooden pegs which fit in on each side of the handle (*kithumbi*) to keep the lid from falling out. [Text Fig. 3, (3*c*.]

(4) *Itho ya ngai*.—Sometimes used for entrance holes which may be made in the lid, but more usually for an entrance hole in the mark (*ubano*).

The tools used in the making of a hive are as follows:—

(1) *Thia*.—This consists of a long handle (*thia*) and an iron blade (*ithoka wa kwasa*) which is fitted to one end by means of a leather ring (*nduyu*). This was formerly of rhinoceros hide. This tool is used for scraping out the barrel.

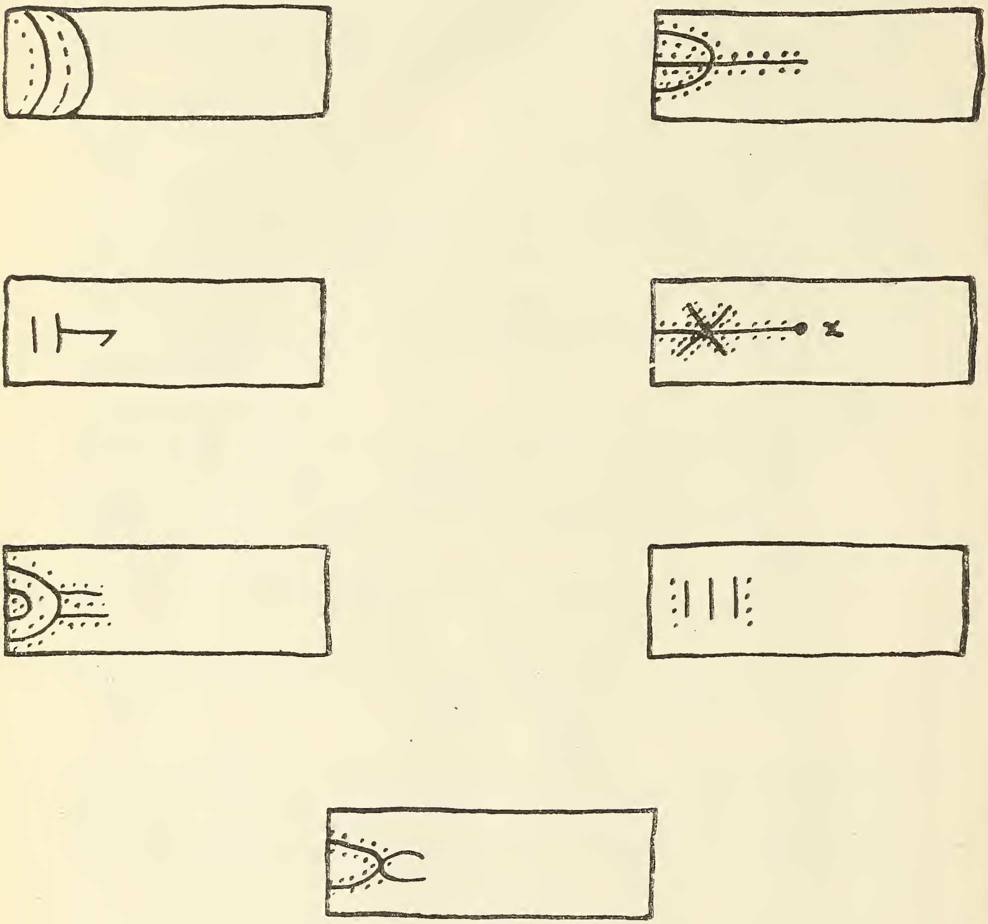
(2) *Ng'omo*.—A kind of chisel or adze with the blade fixed almost at right angles to the handle. The base is fixed in a piece of hide, formerly rhinoceros hide.

(3) *Mutiothoka*.—An axe with a very small blade which is used for doing the heavy work—shaping the log, etc.

(4) *Kwal'ya mbengeo* (or *mbalau*).—A small iron tool used for making the lid.

(5) *Kyoo*.—A small tool for making the mark. This is sometimes cut, sometimes burnt in the wood.

Examples of the clan mark. (UBANO).



(X). The entrance hole for the bees is sometimes situated in the mark.

TEXT FIGURE 4.

Every clan has its own mark (*ubano*) which is put on cattle, arrowheads and beehives. (See Text Fig. 4.) But even within one clan each village may have a special mark and an individual may vary it slightly, so that it is hardly true to call them "clan marks." Moreover, the three marks (i.e., cattle, arrowheads and beehives) of one clan or village appear to bear no resemblance whatsoever to each other, though it has been submitted that they were originally identical. (See Lindbolm's *The Akamba*, p. 135.)

In the hypothetical case of two villages discovering that their marks are the same, a meeting of the elders from each village would be held and they would come to some agreement as to who should make the necessary alteration.

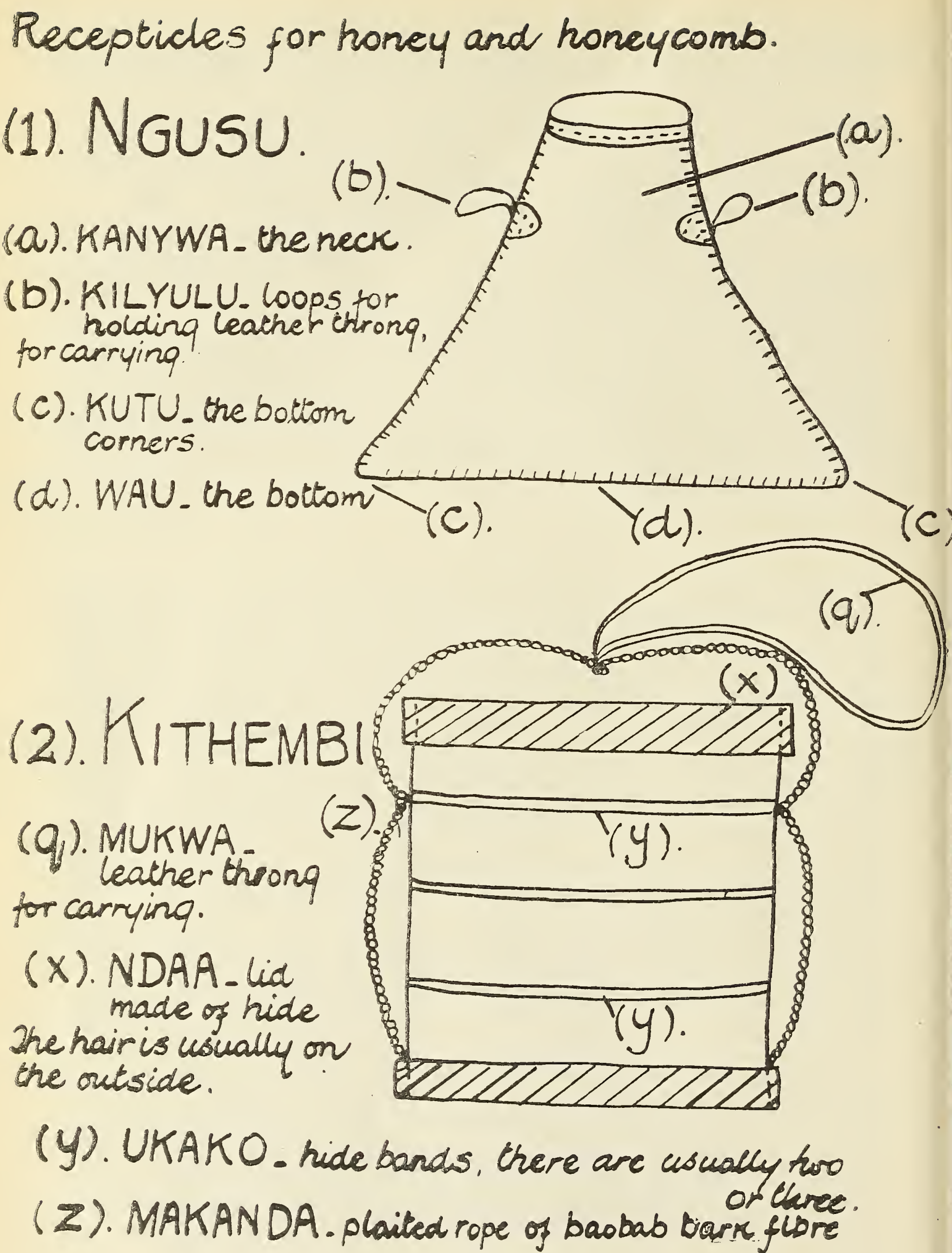
If anybody alters or obliterates the mark on a beehive other than his own, either innocently or for the purpose of theft, it is believed that he will die shortly afterwards. Should he, however, remove the part of the hive bearing the mark and insert a new piece of wood, this automatic sanction will not operate. (For examples of marks on beehives, see Text Fig. 4.)

V.—Preparation of the Hive.

When the hive has been constructed, seasoned, and is ready for use, it is singed inside with a bunch of lighted twigs to remove any small projections, etc., for the Akamba know that bees like the inside of a hive to be quite smooth. This is usually done with the leaves and twigs of certain trees, viz., *mutaa, juutu* or *munondo*. These are all aromatic woods and the smell left in the hive after they have been burnt is attractive to bees. It has been said that the smoke of certain wood is used to keep snakes away from the hive. (See Lindbolm's *The Akamba*, p. 495.)

The hive is carried by the owner or one of his sons to the place where it will be put in the tree. It is usually carried on the back, being kept in place by a cord of plaited grass or banana leaves passed around the forehead. All the work connected with bee-keeping is essentially man's work, so that although it is usually the women who carry things it is the men who carry the hives. Women, however, often carry honey in the *ngusu* (see Text Fig. 5 and Plate 52) after it has been extracted from the hive.

African bees are well-known for their fierceness. Horses and other large animals have been stung to death. Indeed, they have battle honours, for at Tanga in 1914, the British forces were routed by bees, the German troops having set trip-wires attached to the numerous beehives in the woods which they knew the enemy would occupy. The Akamba, accordingly, treat their hives in a special manner with a view to lessening the fierceness of the future inmates. "A kind of lizard, *inyolo*, is put into it (the hive) and a bit of honeycomb is rubbed against a bit of mutton,



TEXT FIGURE 5.

PLATE 52.

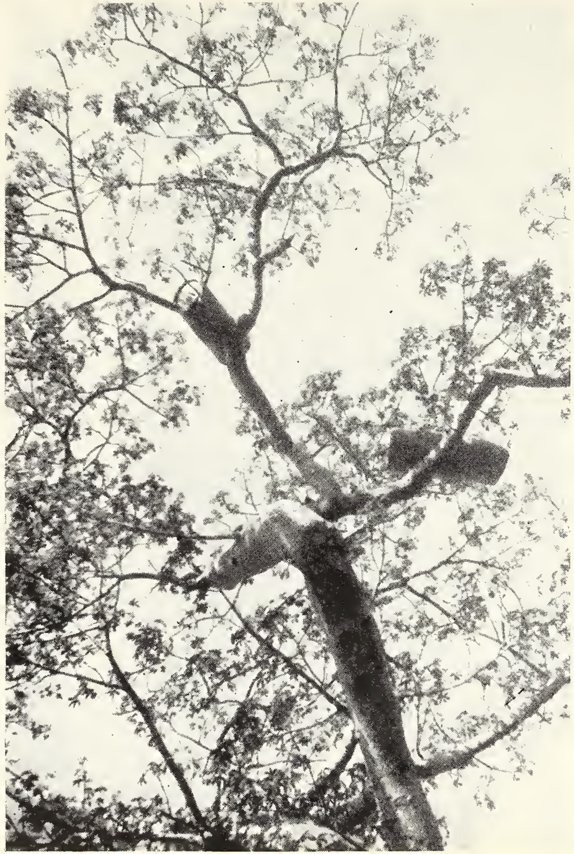
". . . women, however, often carry honey in the *ngusu* . . ."
(Page 265)

". . . steps are made up the trunk by means of wooden pegs . . ."
(Page 267)

PLATE 53.

A fork which is considered "good-for-placing-a-hive-in" is called *kitumbi.*"
(Page 268)
Note the swarm of bees below the hive.

PLATE 54.



"A branch is cut short and put through a hole in the bottom of the hive."
(Page 268)

". . . this stick has a hook at one end to put over the branch and is called *mboloi* . . ."
(Page 268)

after which the bees are ordered not to be fierce, but to behave as peacefully as the lizard. Both this and the sheep being very harmless animals, the procedure is evidently a kind of homeopathic magic. To make bees gentle in this way is called *kubobia.*" (See Lindbolm's *The Akamba,* p.495.) Some honey is put in the hive, which may also be smeared with honey, in order to attract the bees.

VI.—Setting the Hive.

The place where a man will put his hives partly depends on the prevailing system of land tenure, partly on the space available and partly on the intrinsic goodness of a locality from the point of view of honey production.

The Akamba system of land tenure, like other African systems, is difficult to understand from the angle of Western legal terms and is probably subject to considerable variation in different localities; it is not intended to advance any theories on the subject here—they would probably be wrong. It appears, however, that two main principles govern the holding of land. The one is covered by the term *weu* and the other by the term *ng'undu. Weu* is common land and may be used by anybody for cultivation, grazing or placing beehives. This is open, sparsely inhabited country. *Ng'undu* is land held by a form of individual tenure and is found in thickly inhabited country. What are causes and what are effects does not concern us here, but only the fact that a man cannot put his beehives on another man's *ng'undu,* but only on his own. It follows that where *ng'undu* applies the owner of a large number of hives may have to go a long way in order to find common land where he can place some of them. If he has not sufficient land of his own, he can, of course, make an agreement with a neighbour with regard to putting hives on his land; this, however, is not always possible as he may require it for his own. There may not be many trees, and in any case the number of hives which can be worked successfully in a given area is, naturally, limited. Again, the locality in which a given individual lives may not be a good one for the production of honey.

Certain trees are favoured for placing hives, the foremost being the *mwamba* (baobab), where it is found growing. Fifteen hives in one of these giants is nothing remarkable. The *makuyu* is another favourite. Steps are made up the trunk by means of wooden pegs. (See Plate 52.) Hives are, of course, placed in the honey-producing trees which have been mentioned (see II above), when they are found large enough. Any tree may be used if it is considered suitable, but hives are never placed in trees sacred to the ancestral spirits (*aiimu*).

Hives are frequently put in what appear to be quite inaccessible places, and it is not very unusual for a man to receive

a serious injury, or even to lose his life, by falling from the tree when putting up or extracting honeycomb from the hive. There are three ways of setting a beehive, the first being used whenever possible.

(1) *Wedging the hive in a fork.*—An ordinary fork of a tree is called *mwaka*, but one which is considered "good-for-placing-a-hive-in" is called *kitumbi*. (See Plate 53.) The fork is often improved artificially by cross sticks bound in place with fibres.

(2) *A branch is cut short and put through a hole in the bottom of the hive.*—The hole is called *kibungu*, and the branch stump *uambo*. (See Plate 54.) The bees often enter by this hole instead of having special entrances.

(3) *Slung beneath a branch on the end of a long stick.*—This stick has a hook at one end to put over the branch, and is called *mboloi*. Hives are sometimes slung on cords only, but the correct method is to use the *mboloi*. (See Plate 54.)

When methods (1) and (2) are used, the end of the hive bearing the owner's mark (*ubano*) will always be facing outwards from the trunk of the tree.

As regards the placing of a man's first hive, custom would appear to differ in different localities. Some Akamba have said that a man may do it himself, others that it must be done by a son or brother, not necessarily, apparently, a full brother, elsewhere, by a paternal uncle; otherwise the bees will not enter the hive. From the time of placing this first beehive the owner cannot cohabit with a woman until the bees start building a comb. If on his next visit the bees have started building, he can cohabit again on the following night. When he finds that the bees have started building, he will usually brew some beer and pour out a libation to his ancestral spirits (*aiimu*), in thanksgiving.

VII.—Extracting the Honey and Honeycomb.

When by inspection the time appears ripe to open the hive and extract the comb and honey, the owner will probably bring with him at least one helper. Lindbolm says (p. 498) "During this work he may not have coitus (sexual taboo). A man who has other people to help him gets them to take an oath by the *kithitu* to abstain from sexual intercourse . . . . . . this prohibition seems to be in force for about ten days onward, or during the time which is considered to pass until the bees have again begun to bring honey to the hive. When this time is at an end the owner of the hive has a look at his bees. If they have abandoned their nest or have not begun to collect honey, he is certain that his assistants have broken their oaths to abstain

from coitus. He then prepares *ngondu*, a purifying medium, and spreads it together with a piece of mutton on the beehive." As a general rule the bees will start working again almost immediately, and six days is usually sufficient time to allow them to fill the hive. Ritual intercourse or abstention plays a large part in all Akamba custom, and bee-keeping is certainly no exception. Thus, if the first lot of honey from *new* hives is eaten by a person who will have sexual intercourse before the bees return to the hive it is believed that the bees may cease working or make bad honey.

Honey is extracted from the hive in two ways. If the hive is firmly fixed in the tree, i.e., if either of the first two methods described earlier in these notes is employed, the honey will be taken from it where it stands. If it is fixed by the third method, i.e., slung beneath a branch by means of an *mboloi*, the hive will be lowered to the ground before the honey is extracted. The actual method of extracting the honeycomb does not vary and it will suffice to describe in full the normal case, viz., when the hive is left in the tree.

About an hour after sunset the tree which contains the hive is approached. It is cool. The bees have entered the hive for the night and are silent. A large fire is lighted close to the tree and by its light one member of the party climbs up to the hive, taking with him a long, thick rope made of baobab-bark fibre, called *mwii*. To one end of this is attached a smooth triangular block of wood some 15 cms. long, called *n'gon'gusu*. He takes up a position (usually very precarious) close to the hive and throws down the free end of the rope, which is caught by a man waiting below. The end to which the block is attached is thrown over a convenient branch near the hive and let fall. Meanwhile his assistant below is attaching a receptacle, called *kithembi*, to his end of the rope—at about two feet from the end, which is left free for a moment. He has also prepared a bunch of thin sticks bound together like a miniature Roman *fascis*, called *umui*. (The name for an ordinary brand is *kisinga*.) One end of this he now lights in the fire, after which he ties it to the loose end of the rope so that it will hang below the *kithembi*. The man in the tree hauls these up, helped by the man on the ground as soon as the other end of the rope reaches him. The man on the ground then holds the *kithembi* in position near the hive by keeping his end of the rope taut during the rest of the proceedings.

The operator in the tree now takes the brand in one hand, blows on it to make it burn brightly, and then moves it slowly with a circular motion close to the lid of the hive. If the bees have a way out they may use it and will usually cluster on the outside of the hive; more often, however, they remain inside with the queen, who by now has been driven to the further extremity of the hive. After a few moments, when the first angry buzzing has given place to a more regular hum, the lid is carefully

removed, the brand being kept close the while to hold the bees at bay. It is advanced to the mouth of the hive, driving any bees that remain inwards from the first comb. This is then cut out with a knife, shaken to remove any stray bees, and placed in the *kithembi*. The process is repeated until about two-thirds of the comb has been removed. The hive is then closed, the *kithembi* and brand lowered, and the operator descends from his perch. On reaching the ground he examines the honey, removes any stray bees from it and from his person, pushes the knife through the combs and puts on the lid. After the rope has been carefully coiled the party makes its way homewards, the remains of the brand being used as a torch to light the road.

In a case where the hive is brought to the ground in the first instance the procedure is practically the same. One man climbs the tree with his rope, fastens it to the hive and gently lowers it to the ground, where the honeycomb is extracted in the manner just described. One end of the hive is propped up on a log or stone. When the work is finished the hive is hauled up into the tree and made fast.

Only when the hive is to be taken away will all the honeycomb be removed; otherwise about one-third is left in the hive. Very great care is taken to try and leave comb containing eggs and larvae untouched, and should one half of a comb contain honey and the other half eggs or larvae, the former will be cut away and the latter left. This, however, is not always possible owing to the shape of the hive and the indiscriminate way in which the queen lays her eggs. It is very seldom that the operator gets badly stung; how well the bees are controlled and how little feared is shown by the fact that the combs (except for the first one or two) are usually cut out from the midst of the bees, it being necessary to stretch the arm down the length of the hive. These combs when taken out are a solid mass of bees, which are removed by gentle shaking and scraping. During the whole proceedings very few bees perish—indeed, the method is in striking contrast to the old European way of clearing a "skep," involving as it did all the horrors of the sulphur pit.

The comb when brought to the village is pounded to extract the honey.

VIII.—Method of Carrying and Storing Honey.

Two other items in the bee-keeper's equipment must be described. They are no longer universally used, their place often being taken by empty kerosene tins or tin basins purchased from traders.

(1) *Ngusu*.—A triangular skin bag, which is slung on the back by means of a leather thong (*mukwa*) round the forehead. It may be carried by women. (See Text Fig. 5, 1 and Plate 52.)

(2) *Kithembi.*—A wooden barrel with a skin bottom and lid (*ndaa*), usually about 45 cms. to 50 cms. in height and 25 cms. to 30 cms. in diameter.

It is customary to use the *ngusu* for carrying honey; for storing, it is put in the *kithembi* and slung from the roof poles of the hut. The *kithembi*, as noted earlier, is also used when taking honeycomb from the hive. The *ngusu* is so constructed as to hold as much honey as may be taken from a well-filled hive of average size.

To take honey from a hive is *kutwa*. To look for wild honey is *kulaka*.

IX.—Customary Law Relating to Theft of Beehives and Honey.

The theft of honey and the breaking of beehives has always been considered a very serious crime among the Akamba. Lindbolm (p. 160) says "the reasons why the fines are so high would seem to be that the beehives are hung out in the wilds at a long distance from the owner's village so that it is impossible to watch them . . . . . . a honey thief is an extraordinarily despicable person, and this has penetrated so deeply into the national consciousness that, even if a man is nearly dying of starvation, he can only in extreme cases bring himself to take honey from the beehives without permission." In order to protect his hives, the owner will use various magical means, and will try to spread the news that they are so protected. As a result of this, the thief may find a snake waiting for him as he descends the tree, or may find his hands caught fast when he touches the hive. (Lindbolm's *The Akamba*, p. 500.)

Nevertheless, theft occurs and has always occurred. In famine years it may become very serious indeed. The customary punishments for honey-theft vary considerably in different parts of Ukambani, and the experts differ in their accounts. The following punishments are all considered customary:—

(1) A fine of one goat and one cow, to be eaten by the officiating elders, and all property to be returned.

(2) The owner of the hives (irrespective of the number stolen) to be paid seven goats and all property to be returned.

(3) Lindbolm records a case where the offender paid one bull and five goats, and states that for a second offence the amount may be doubled, for a third trebled, and so on.

(4) Application of *king'oli* in all cases. (In pre-Government days, *king'oli* was a form of capital punishment deriving its name from a general meeting of the tribe to discuss public policy, and to try cases punishable by death, i.e., witch-craft and other anti-social crimes.)
(5) Application of *king'oli* on the third offence.

I make no attempt to show which of the above might be the true custom; it is more than probable that they are all true customs, varying according to time and place. There is no doubt, however, of the seriousness of the offence, and the modern Native Tribunals always impose heavy sentences for honey-theft. Lindbolm remarks that in Taveta, near Kilimanjaro, it was formerly the custom for the number of cells in the stolen honey to be counted, if found, and the owner could claim a goat for each cell.

X.—Inheritance of Beehives.

"When an owner of beehives dies, his nearest relations proceed to his hives and throw small stones or clods of earth against these to attract the bees' attention, saying, 'Wake up, you bees! Your owner is certainly dead, but because of that you must not cease to work and gather honey! . . . . . .' It appears from this as if the bees are thought to have a close personal relationship with their owner." (Lindbolm's *The Akamba*, p. 499.) This may certainly be the custom in many parts of Ukambani, but I cannot picture them throwing stones actually at the hives, for they know their bees too well to risk playing any tricks with them.

The son or sons of a deceased man inherit his beehives. The heir, however, must not take the first lot of honey from them himself; to do this courts death. An elder is appointed to perform the necessary ceremony, and the honey must be removed by a paternal uncle.

XI.—Conclusion.

Lindbolm (p.497) states that during his stay in Ukambani he never heard anything of the honey-indicating bird [*Indicator indicator* (?)]. The bird, however, is certainly well-known to many Akamba in the Kitui area, and it has been pointed out to me on several occasions. It appeared to be a dark grey and white bird, rather larger than a House Sparrow, and uttered a loud, high-pitched "Chee . . chee . . chee . . chee . . ." It is called *nzelizeli*, or *nsese*. As in other parts of the world, it is said to lead one to honey as a general rule, but must be followed with caution as it occasionally leads one to a wild animal or a snake.

This unpleasant alternative is known by the word *kalimasoso*, which appears to be an abstract noun connoting "the possibility of finding a wild animal where one expected to find honeycomb," or as a general term denoting whatever unpleasant thing one finds there. I have been told that an Mukamba is never afraid to follow the bird except through dense bush, as he can see for himself whether or not there is any danger.

The Mukamba bee-keeper is deeply attached to his bees and will talk to them and even pray to them. He respects their apparent intelligence and marvels at their industry. He knows how to look after them and how to control them; and when he is in a position to control them he is without fear. Nevertheless, he is never foolhardy, and none knows better than he the potential power possessed by these tiny creatures; a power which they will use without hesitation in defence of their homes.

CORRIGENDUM.

Mr. G. H. E. Hopkins has drawn attention to the fact that in Dr. Leakey's "Notes on the *Falconidae* in the Coryndon Memorial Museum," pages 103-122, and in the "List of Members," page 136, of the last number of the *Journal* his initials have been given incorrectly. "E. S. Subuga" in the penultimate line of page 103 should read "E. Nsubuga," a bird-boy formerly employed by Mr. Hopkins.

OCCASIONAL NOTES.

SOME MEASUREMENTS OF KENYA BIG GAME. I make no apology of bringing to notice and placing on record these measurements of some of the big game animals of Kenya. These were taken by Lieut.-Col. C. H. Stockley, D.S.O., M.C., and are especially valuable as so few men have taken such accurate and elaborate measurements in the field and also, as far as the writer knows, this is the first time such information has been published.

It is hoped that this work, so well begun by Col. Stockley, will be extended to include all the other big game animals. This *Journal* is only too pleased to publish such figures, but they must be accurate and taken so as to fill in the headings in Col. Stockley's list.

HUGH COPLEY.

PALM TREE VERSUS SWORDFISH. There has been displayed in the Coryndon Museum a most remarkable exhibit perhaps unique in any Museum. This is a portion of palm tree into which has been rammed the sword of a swordfish (*Xiphias gladius*).

The history of the exhibit is as follows: Boys told Mr. J. Carberry that the trunk of a palm tree had been washed ashore in which was embedded the sword of a swordfish. Mr. Carberry and Mr. Trench went up the coast a little way from Mr. Carberry's house and found the trunk of the coconut tree. They had the section containing the embedded sword cut off and Mr. Carberry presented it to the Museum. The trunk and the sword, judging from its condition, must have been floating many days or months and as soon as the water dried out became very fragile. The two accompanying sketches with dimensions will give one an idea of the force required to drive the sword in. There must have been a hectic struggle before the sword broke off which must have meant the death of the fish.

One most interesting thing about this exhibit is the fact that it is the first instance recorded in our literature of the presence of the true swordfish in the Indian Ocean.

The sailfish is common whilst the Museum has the head of a marlin taken off our coast, but we have had no previous knowledge of the swordfish.

HUGH COPLEY.

LEY.

Locality and Elevation.	Remarks.
Embu 4,500′.	A large full maned male. Shot 18/11/38.
Mt. Kenya 6,000′.	Shot 10/7/38.
N. Guaso Nyiro.	Presumably *G.g. brighti*.
N. Guaso Nyiro.	Presumably *G.g. brighti*.
Lemek Valley 5,500′.	Presumably *G.g. granti*. Shot September, 1941.
Lemek Valley 5,500′.	Presumably *G.g. granti*. Shot September, 1941.
Lower Tana Valley 1,000′.	Shot 20/9/38.
Lower Tana Valley 1,000′.	Shot 18/9/38. Male.
N. Guaso Nyiro 3,000′.	Shot 8/12/38. Immature.
N. Guaso Nyiro 3,000′.	Shot 5/12/38.
Embu.	Shot 18/11/38.
Thego River Valley 6,000′.	Shot 2/3/41. Male.
Thego River Valley 6,000′.	Shot 12/2/40. Female.
Lower Tana Valley 1,000′.	Shot 21/9/38.
Ragati, Mt. Kenya, 8,000′.	Shot January, 1938. NOTE.—The measurement of neck is "middle neck."
Aberdares 10,500′.	Shot, March, 1939. Boar.
Aberdares 10,500′.	Sow.
Thego Valley 6,000′.	Old bull. Dimensions of horns: Outside width 43½″. Tip to tip 26″. Round inside curve 34½″ each horn. Palm 10¼″.
Aberdares 9,000′.	Old boar. Shot 21/12/42.
Aberdares 9,000′.	Immature about three months old. Shot 21/12/42.
Thego Valley 6,000′.	Old cow. Horn very thick for cow. Shot 5/1/43.

an the true; the weight being off the feet.

MEASUREMENTS OF KENYA BIG GAME TAKEN BY LT.-COL. C. H. STOCKLEY.

Serial No.	Species.	Height at Shoulder.	Height at Rump.	Length: Nose to Root of Tail.	Length of Tail.	Girth of Chest.	Girth of Throat.	Girth Base of Neck.	Depth of Chest (Straight).	Depth Base of Neck (Straight).	Depth Throat (Straight).	Girth of Forearm.	Length of Horns.	Girth Round Head Behind Jaws.	Girth of Neck.	Width Rhinarium.	Across Forehead to Outside Edges of Facial Processes.	Tushes.	Girth of Belly.	Hind Cannon Bone (Girth).	Fore Cannon Bone (Girth).	Foreleg at Junction with Chest.	Locality and Elevation.	Remarks.
1.	Lion	39½″	34″	84″	32½″	48″	27″	29″	—	—	—	16½″	—	—	—	—	—	—	—	—	—	—	Embu 4,500′.	A large full maned male. Shot 18/11/38.
2.	Bushbuck	30½″	—	48¾″	9¼″	29¼″	13½″	16½″	—	—	—	—	15½″	—	—	—	—	—	—	—	—	—	Mt. Kenya 6,000′.	Shot 10/7/38.
3.	Grant's Gazelle ...	34½″	35″	56½″	10¼″	34″	18″	23½″	—	—	—	—	22¾″	—	—	—	—	—	—	—	—	—	N. Guaso Nyiro.	Presumably *G.g. brighti*.
4.	Grant's Gazelle ...	34¾″	—	58½″	10¼″	35½″	18½″	23¾″	—	—	—	—	23¼″	—	—	—	—	—	—	—	—	—	N. Guaso Nyiro.	Presumably *G.g. brighti*.
5	Grant's Gazelle ...	36¼″	36½″	56″	10″	36″	17½″	22″	14″	8″	7″	—	25½″	—	—	—	—	—	—	—	—	—	Lemek Valley 5,500′.	Presumably *G.g. granti*. Shot September, 1941.
6.	Grant's Gazelle ...	36¼″	36½″	57″	10¼″	36½″	17¾″	23″	14″	8″	7″	—	25¼″	—	—	—	—	—	—	—	—	—	Lemek Valley 5,500′.	Presumably *G.g. granti*. Shot September, 1941.
7.	Hunter's Hartebeest.	54″	—	72″	17½″	45½″	22″	27¾″	—	—	—	—	25½″	—	—	—	—	—	—	—	—	—	Lower Tana Valley 1,000′.	Shot 20/9/38.
8.	Lesser Kudu ...	41¼″	—	63½″	16″	39¾″	22″	27¾″	—	—	—	—	27½″	—	—	—	—	—	—	—	—	—	Lower Tana Valley 1,000′.	Shot 18/9/38. Male.
9.	Gerunuk	33″	32″	50½″	10½″	25¾″	8¾″	11½″	—	—	—	—	9¼″	—	—	—	—	—	—	—	—	—	N. Guaso Nyiro 3,000′.	Shot 8/12/38. Immature.
10.	Pigmy Leopard ..	18¼″	—	40″	26″	23″	14″	—	—	—	—	6½″	—	—	—	—	—	—	—	—	—	—	N. Guaso Nyiro 3,000′.	Shot 5/12/38.
11.	Bushbuck . . .	31½″	—	58″	8½″	34″	17½″	22½″	—	—	—	—	15″	—	—	—	—	—	—	—	—	—	Embu.	Shot 18/11/38.
12.	Isaac's (Red) Duiker.	19½″	23″	33½″	4¼″	22½″	10¼″	11½″	—	—	—	—	3″	—	—	—	—	—	—	—	—	—	Thego River Valley 6,000′.	Shot 2/3/41. Male.
13.	Isaac's (Red) Duiker.	18″	22″	33½″	5″	—	—	—	—	—	—	—	2″	—	—	—	—	—	—	—	—	—	Thego River Valley 6,000′.	Shot 12/2/40. Female.
14	Haggard's Oribi .	22″	—	38″	4½″	—	7¾″	9″	—	—	—	—	5½″	—	—	—	—	—	—	—	—	—	Lower Tana Valley 1,000′.	Shot 21/9/38.
15.	Bush Pig	25¼″	—	46¼″	13½″	37″	27¼″	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	Ragati, Mt. Kenya, 8,000′.	Shot January, 1938. NOTE.—The measurement of neck is "middle neck."
16.	Forest Hog	36½″	33″	72½″	14″	59½″	36″	—	21″	—	—	—	—	37″	12″	6″	16″	7″	—	—	—	—	Aberdares 10,500′.	Shot, March, 1939. Boar.
17.	Forest Hog	30″	27″	63½″	14″	53″	30″	—	18¾″	—	—	—	—	—	11″	6¼″	—	6″	—	—	—	—	Aberdares 10,500′.	Sow.
18.	Buffalo . ..	53½″	53½″	118″	34″	109″	53½″	—	—	—	—	—	—	—	19½″	—	—	—	113½″	10¼″	10″	25½″	Thego Valley 6,000′.	Old bull. Dimensions of horns: Outside width 43½″. Tip to tip 26″. Round inside curve 34½″ each horn. Palm 10¼″.
19	Forest Hog	38″	37″	68½″	13″	58″	42″	—	—	—	—	—	—	—	—	—	—	—	72″	—	—	—	Aberdares 9,000′.	Old boar. Shot 21/12/42.
20.	Forest Hog	20″	22″	41½″	9½″	34″	22½″	—	—	—	—	—	—	—	—	—	—	—	43″	—	—	—	Aberdares 9,000′.	Immature about three months old. Shot 21/12/42.
21.	Black Rhino ...	63″	—	127″	—	—	—	—	—	—	—	—	19½″	—	—	—	—	—	—	—	—	—	Thego Valley 6,000′.	Old cow. Horn very thick for cow Shot 5/1/43.

NOTE.—All heights at shoulders have been taken from the heel of both feet placed together. This gives a slightly greater height than the true; the weight being off the feet.

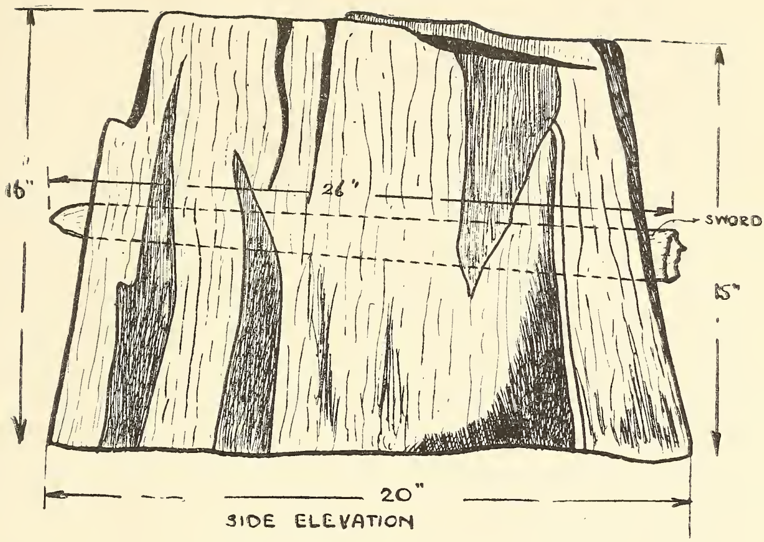


Fig. 1.

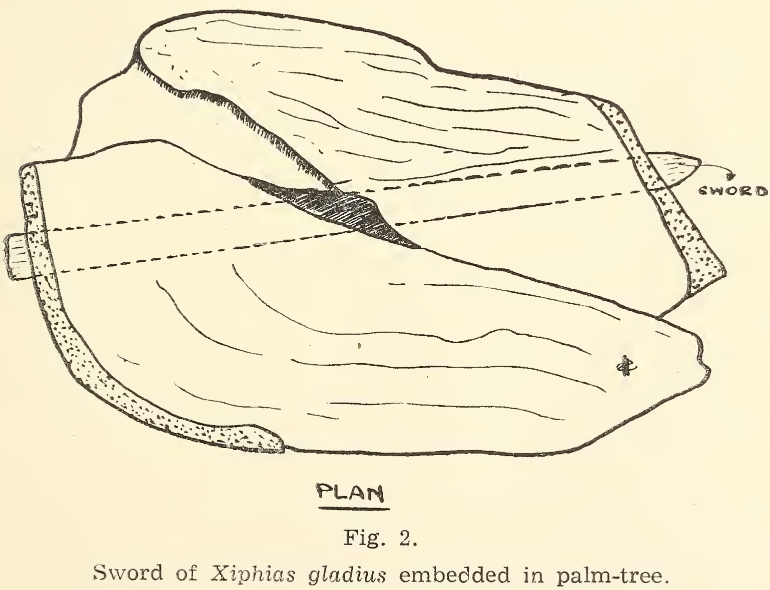


Fig. 2.

Sword of *Xiphias gladius* embedded in palm-tree.

AN UNSCIENTIFIC NOTE ON HAMMERHEAD STORKS. At the end of May, 1942, a pair of hammerhead storks began to make a nest in a fig-tree on the edge of my garden; it appears that they had their nest robbed by school boys the previous season and perhaps they realized that this garden is a sanctuary for all harmless birds. For various reasons, I did not want the nest where it was and twice pulled down the first sticks. However, they were very determined and when they chose a jacaranda in full view from the verandah and not more than 80 feet away, I let them build. They started building in this tree early in June, and every morning at about 6-30 one heard their curious harsh cries as they brought sticks and dry grass and arranged them. They had strict trade-union laws and never laid a stick after 10-30 in the morning; but a few more were allowed in the evening at about 5 o'clock. They worked all June, and at the end of the month had made a huge cup-like nest and by then it seemed to me that one bird did most of the carrying while the other placed the sticks and often unbuilt a bit and replaced it to her satisfaction. I saw her moving round and round the nest inside apparently pressing the sides with her shoulder as though to smooth it. The nest at this stage was about 30 inches across and 12 or 15 inches deep. It would easily have held a child of 12 months old.

At this time, unfortunately, we went away for nearly a month and so never actually saw the roofing; but before I left I was a little surprised to see that a "depression" had appeared on the side towards the house, as though someone had sat on it heavily.

Returning at the end of July, we found the nest roofed over and a very small hole of ingress left low down and rather under the vast roofing, just where I had noticed the "depression" before I left. The whole nest by now was about 5 feet across and 6 feet high and for several weeks more sticks were brought continually and disposed about the top by one bird. I never saw any form of lining taken inside, so suppose any such was taken in during July.

It is impossible to say at what date the hen laid or started to sit; but I think early in August, and, from then on, she only came out early in the morning and late in the evening and the cock visited her at mid-day. I personally never saw him bring food, although a friend said that he saw him take a frog in once. When she came out both birds would stand on top of the nest before and after going off to feed. The first squeaks were heard from inside towards the end of September; but still habits remained entirely regular and the parents were only seen three times a day, early in the morning, at mid-day and in the evening and never carrying any food. The parent bird would come with a squawk and land on the nest where it would remain for very many minutes, looking thoughtful, then get restless, walk about

for a bit and suddenly squawking again launch itself off and down, turn and make the spectacular dive up into the nest.

I can only suppose that, like the secretary bird and many others, the hammerheads predigest their childrens' food and regurgitate it for them. This continued till November 10th, when I found one highly ridiculous and ugly storklet on a path near the nest. He could fly a very little, preferred walking and was very tame. A second appeared two days later, rather a knock-kneed and "gangling" youngster, larger than the first and more ungainly. These two sat all day on the drive near the house and stopped all cars coming up, as they would not get out of the way!

Finally, five babies were out, wandering about on the paths, making occasional tentative dabs at insects on the ground and condescending to eat a worm or two that I provided. Then one morning, November 14th, one was found dead, from starvation and cold combined, and it was only then that I wondered where they slept and having a free evening, sat, waited and watched. I saw three babies enter the nest at about 5-30: the fourth tried three times; but failed to achieve the difficult entrance and sat sadly on an archway nearby. So, at dusk, with no difficulty, we caught him by the feet and legs, put up a ladder and just managed to stuff him into the hole. Next evening I was out and only went after dinner to inspect, when I found the silly bird out again and rain was coming on. So I caught him again and as it was too late and dark to use the ladder, I put him in a dog-kennel where he stayed quite quiet, warm and dry all night and joined the family party at breakfast time.

Then another tragedy occurred, we found the single wing of a baby and a hawk was observed hanging about the garden. We frightened it off before it got any more and three of the youngsters grew up safely; but came home to sleep regularly up to nearly Christmas. Now, on January 26th, at least two birds still use the nest each night and possibly more; but whether young or old, I cannot say as they are all the same size by now and much the same colour. When first out the babies were far darker than the parent birds.

The entrance into the nest, when seen by night by the light of a strong torch, is not just a hole; but a well-roofed tunnel through the thick wall of sticks. By day-light one can see nothing but a dark orifice.

LADY MURIEL JEX-BLAKE,
Kyuna, Nairobi.

WASPS AND SPIDERS. While travelling one night between Moshi and Voi, I noticed what seemed a curious small beast move across the road with jerky, hesitating hops. I stopped in order to investigate its nature and I found it to be a giant hornet

dragging a huge and helpless spider of the so-called bird-eating kind.

I captured both the hornet and its prey and had the occasion later to learn more about the two.

It appears that many hornets belonging to the tribe of the *POMPILIDAE* select spiders as their special, if not their only, prey. The spiders are not devoured by the wasp; they serve as food for its young. The wasp attacks with great skill and soon succeeds in immobilizing the spider by stinging it with its powerful sting. In the case of my giant hornet—*Pompilus nigerrimus* Sco.—the sting had a telescopic arrangement, and fully extruded it measured 12 mm., or nearly half an inch.

The spider — *Pterosinochilus affinis* Tullgren — must have been several times the hornet's weight, and with its powerful, poisonous fangs it must have been a formidable opponent to overcome.

Some years later — on a holiday in the Bavarian Alps — I observed an identical occurrence on a miniature scale. This time it was the hornet *Tetradentonyx herons* Huerin which had captured the spider *Trochosa terricola* Torell. In every detail the proceeding was the same, and I had the opportunity now to watch further developments.

With great pains the hornet dragged the spider along the ground and several feet up a stone wall until it found a suitable hole in which to deposit its victim. When the spider was firmly placed in the bottom, the wasp laid an egg on its body. It then flew away to get wet soil with which it walled up the hole.

It took great pains to smooth out the surface perfectly and, in the fashion of an artist, it stood back several times to survey the effect, returning again and again to smooth here and to pad up there until it was completely satisfied.

Plate 55 shows the giant pair from Tropical Africa opposite the miniature counterparts from Central Europe.

PETER R. O. BALLY,
Coryndon Memorial Museum.

STEAM JETS IN LONGONOT CRATER. Steam jets have been observed inside the crater of Longonot on many occasions, but quite often no trace of them can be seen.

While their intermittance has often been attributed to periods of alternating activity and rest, the following observations may contribute to explain their variable visibility.

On May 20th, I was invited to climb the mountain in the company of Lieut. W. G. Kendrew, R.N.V.R., and Lieut. P. C. Spink, R.N.V.R., of the Naval Meteorological Service, and Mrs. Thompson. We arrived at the crater rim after a two hours' climb

PLATE 55

Pterosinochilus affinis.

Trochosa terricola.

Pompilus nigerrimus.

Tetradentonyx herons.

Hunting wasps and spiders.
(Page 280)

from Longonot Station, at about 1 p.m. The sky was overcast and a shower was approaching from the Aberdares.

On our arrival no steam was visible at any point of the crater. We stopped for lunch for about one hour in a sheltered place from which the crater could not be seen; during that time a fairly heavy and cold shower fell all over the mountain and the temperature dropped considerably. When we resumed our walk along the edge of the crater we saw steam rising from at least two dozen spots all around the inner slopes; some of the jets seemed to be under pressure. Arriving at the south side of the crater we climbed down to the crater floor and we were able to inspect one of the lesser jets on the slope at close quarters. The wet ground was warm to the touch and near the jet itself the rock, covered with only a thin layer of vegetation and algae, was quite hot. The jet itself consisted of a hole or crevice in the rock, 1½ by 2 feet wide, leading deep down into the side of the crater. It was impossible to reach inside without getting one's hand scalded.

Steam was rising gently from the hole forming a column about 20 feet high. There was no sulphurous smell nor did breathing it produce any ill-effect on us. The steam smelled like that of pure water, "like a laundry" as Mrs. Thompson remarked.

Most of the jets were seen where the inner slope touches the crater floor, but some of the largest were about half way up, and one isolated jet was quite near the summit, about 1,000 feet above the crater bottom. The latter is strewn with large loose bolders of pummice stone and entirely overgrown with dense bush, mostly "ol-leshwa" (*Tarchonanthus comphoratus*).

When the sun emerged from the clouds the visibility of the jets declined rapidly, and soon all but the most powerful jet had disappeared, perhaps this remained only because it was situated in the cool shadow of the summit.

We completed the circuit of the crater, and on our way down from the summit Lieut. Spink, who had previous experience of sulphur fumes from a recent investigation of the crater of Kilimanjaro, noticed a sulphurous smell on several occasions. As we were short of time, we could not inspect the largest and rather inaccessible jet which seemed under considerable pressure.

From our observations it would appear that the jets are of a constant nature, but that, normally, the heat generated in the hot rocks by the sun does not allow the water vapour emitted to condense into visible steam. The cold shower cooled the atmosphere in the crater very rapidly and it increased the evaporation through water running into the heated crevices and jets, thus giving the effect of very much increased activity.

Peter R. O. Bally,
Coryndon Memorial Museum.

A TRAGEDY ON THE TANA RIVER. When travelling on the Tana River in January, 1943, we happened to witness a tragedy—perhaps not very uncommon—but seldom seen by man.

We were camped in Balambala in Garissa District when riverine natives reported that not far away two elephants were bogged in a swamp; they had been known to be there for the last four days and one of them was said to be still alive.

Mr. W. Hale, the District Commissioner for Garissa, who was in charge of our party decided to visit the spot at once to see what could be done in the matter, the ivory of any dead elephant being the property of the Crown.

Our lorry took us to a few hundred yards from the swamp. As we approached the place on foot, an overpowering stench told us that at least one of the poor beasts must have been dead for a considerable time.

The swamp was thickly-grown with tall reeds and we advanced through them only slowly in the ever-increasing stench. Rounding a clump of rushes we came suddenly upon a small clearing formed of black, semi-liquid mud and—in its centre—apparently dead, the half-submerged and motionless shape of a young bull elephant (Plate 56). While we surveyed the sad scene, he emitted a groan, lashed weakly about with his trunk and blinked at us from a frightened, mud-caked eye. As we approached nearer he struggled still more, but quite ineffectually, with the legs of his right side which were still showing above the surface of the slimy morass.

A little further—with blown body and with half her head already picked clean by vultures—was the carcass of a large cow elephant in a similar position.

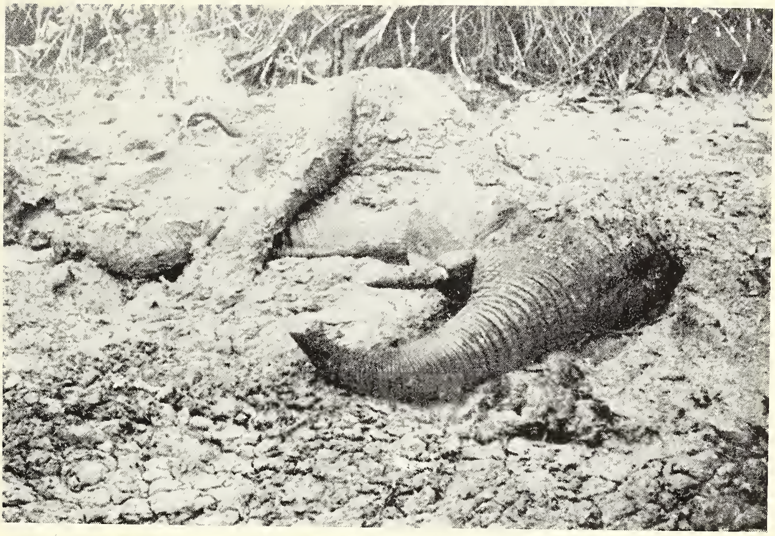
Turning our attention again to the bull we soon convinced ourselves that he was quite beyond our help. With some difficulties we had managed to pass a strong sisal rope around one of his hind legs, but when we suggested to the score or so of natives who had soon gathered round us—and who thought the distress of the helpless and dying beast a very good joke indeed—to assist in pulling it out, they quickly backed away saying that once on his legs he might turn on them.

In actual fact, it is doubtful that twice their number would have sufficed to move the heavy body and to overcome the tremendous suction of the morass on such slippery ground where one's feet found little purchase.

Moreover, the poor brute was so exhausted and emaciated that in all likelihood he would not have survived his liberation.

It was unthinkable to leave him to his fate, to be set upon by vultures while still alive; the only alternative was a quick bullet through his brain. Mr. Hale took a careful aim and thus ended his sufferings which must have lasted for many a long day and many a long night.

PLATE 56.



A tragedy on the Tana River.
(Page 282)

It was a great relief to know that all was over, but we left the place with very heavy hearts.

Incidentally, it is due to similar accidents in the dim past that we are enabled to build up our knowledge of the world's prehistoric fauna.

Under normal circumstances a carcass—even of the largest animal—disappears in an astonishingly short time without leaving a trace.

Vultures, hyaenas, jackals and other scavengers dispose of the fleshy parts within a few days. Ants and maggots devour all cartilage, and the action of the changing seasons reduces the largest bones to dust in the course of a few years.

In the early days of African exploration—before this rapid and thorough disintegration was properly recognized—the practical absence of recent remains was explained by fantastic tales of hidden places, so-called "elephant cemeteries," where all elephants were supposed to foregather when they felt death approaching.

Fossilisation—or permanent preservation of animal remains—can take place only under certain conditions:—

Complete and prolonged absence of moisture, combined, of course, with the absence of scavenging beasts is one of them; in desert countries and in certain caves such conditions obtain.

Exclusion of the air and embedding in an inert substance present even more favourable conditions for perfect preservation. One of the classic examples of such are certain asphalt lakes in Northern America, where many large prehistoric animals were trapped together with numerous carnivores like sabre-toothed tigers who had tried to take advantage of their plight and were trapped in their turn.

Impregnation with mineral salts sometimes changes the chemical composition of the bones entirely, but the infiltrated substances replace the bony structure so perfectly and accurately that even their cellular structure remains for us to study—a cast in the true sense of the word.

A large percentage of fossils, however, we owe to the remains of animals which have perished ignominiously in morasses and bogs, such as we witnessed in the ill-fated swamp of Balambala.

PETER R. O. BALLY,
Botanist,
Coryndon Memorial Museum.

AN ACCIDENT TO A STORK. In the last days of March, Mr. C. G. MacArthur, Assistant Game Warden, saw a European stork with a short arrow stuck through his neck, on either side of which it protruded.

The bird seemed not much the worse for its unhappy plight, for it flew off with its companions when Mr. MacArthur attempted to catch it.

It allowed him, however, to come near enough to observe that the arrow was smaller and different in make than any made by East African natives, and that it had pierced the neck about the middle.

On April 28th, our garden boy in Nairobi, brought me a stork in the last stages of exhaustion. The upper portion of his neck was swollen nearly to the size of a fist, and below the swelling were two large festering wounds from which a dark brown and evil smelling liquid was oozing.

The bird was killed at the Museum where it was found that the gullet was perforated and must have been obstructed for a considerable time by the object which had pierced it, for the distended and inflamed part contained three fair-sized crabs and other decayed matter.

There is little doubt that this stork is the bird seen by Mr. MacArthur more than a month before, and it is remarkable that it should have survived such serious injury for such a long time and to have been able to travel such distances: Nairobi is 110 miles from Kibwezi as the crow flies, and if Mr. MacArthur's opinion about the foreign make of the arrow is correct, the stork must have travelled already a considerable distance before reaching Kibwezi.

PETER R. O. BALLY,
Botanist,
Coryndon Memorial Museum.

MACKINDER'S OWL, *Bubo capensis mackinderi.* This large eagle owl which is probably the most handsome of all the owls in Kenya, was first discovered by Sir Halford Mackinder in the forests of Mount Kenya. For a long time it was believed to be restricted to Mount Kenya, but there is now evidence that it occurs in other forested areas at a high altitude.

There are three specimens in the Coryndon Museum, one from the type locality, one from Parklands, Nairobi, and one from Ol Joro Orok on the Gilgil-Thomson's Falls railway.

The Museum authorities are anxious to obtain further information on the distribution of this owl and would be grateful if members would send in any large owls that are shot or are found dead on the roads, having been killed by cars at night.*

L. S. B. LEAKEY,
Hon. Curator.

*Since going to press a further specimen has been received. This was shot by Mr. Richard Bingley on Dondore Farm, between Gilgil and Nakuru, at an altitude of 7,500 feet, on May 17th, 1943. The wing measurement is 392 mm.

NOTES ON A NEST OF *Tchitrea viridis viridis.* I have observed a pair of nesting paradise flycatchers and I have written these few notes of the breeding behaviour of these birds at the request of Dr. Leakey, Hon. Curator of the Coryndon Museum, where I am working.

The nest was on a tree a few yards from the house where I am living in the neighbourhood of the Museum. It was placed in the fork of a branch four yards from the ground. The branch sways with the wind to and fro about one foot, but the nest was very well built and did not suffer.

Under the branch there was a little path where people, boys, and dogs were passing and repassing constantly, but the building of the nest was not affected by this.

I first noticed the birds when they started to build on April 10th, 1943. The male was in the chesnut stage. At the start both were working on the nest, but the male was the more active and did most of the work, while the female became more and more active as time went on and the nest neared completion. The birds brought dead twigs, debris of leaves, thorns, cobwebs, etc., and with this material they began to build the cup-shaped nest. For this purpose they put down the material (moss, fine grass, and hair) entered, set it under their bodies and so they formed the cup. They made it comfortable, sound and fine, decorated outside with lichen. Having finished arranging each lot of material the male, with a note like: "quì, bì, bì, bì," called the female, perhaps to notify her that he was going off to bring other material. The note of the female was mostly single and soft, but sometimes like that of the male.

The work of building the nest began at about 9 o'clock each day and ceased at about 12 o'clock in the morning, and continued from 3 o'clock to 6 o'clock in the afternoon. So they did about six hours work each day. On the 23rd and 24th April, there was a good deal of rain and the building was interrupted. On 30th April, the nest was finished.

The same day the first egg was laid and the next day the second. On the first day, the female stayed on the nest only about 15 to 20 minutes in each two hours, and the male stayed on it about the same time. After the second egg was laid the brooding was quite constant and the nest was only left for a short time. Both birds took part in the brooding.

The eggs were whitish with brick-red spots on the larger end.

During the brooding, I observed a boubou (*Laniarius ferrugineus ambiguus*) come to the neighbourhood of the nest. At the sight the female rose and called the male uttering a chirping alarm note. Suddenly the male arrived flying up to the boubou and assailing him crossly. The boubou retired methodically ten yards away, but the flycatcher became more and more threatening so the boubou flew away.

Meanwhile the female was waiting.

One day a red-chested cuckoo (*Cuculus solitarius solitarius*) came in the nesting territory and uttered its striking call. The brooding female hopped off at once and stayed quietly observing him. After a little time she returned to hide in the nest.

On 13th May, at 9 o'clock, young birds were hatched.

The pair became very active going in and out from the nest very busily. Both went to catch insects and brought them to the nestlings, but the first day they were too small to eat anything.

The rearing went on well and on 24th May, the youngsters stood on the sides of the nest and made the first trial flight from it, and after an hour they were away flying with their parents.

To summarize: the building of the nest lasted twenty days; the brooding twelve and lastly the rearing of youngsters eleven days.

FERRUCCIO MENEGHETT.

PSITTACULA KRAMERI SCOPOLI. Parrakeet. A pair of these birds was seen during August, 1943, within 20 miles of Nairobi, and it is believed to be the first record of the species for Kenya. During the past six weeks, one or both birds have been seen at frequent intervals in the same locality. No specimen has been collected, but the birds have afforded ample opportunity for detailed study, from many different angles.

The species is readily distinguished by the long, graduated tail, and the dusky throat-band, and there can thus be no question of a mis-identification, since there is no other long-tailed parrot in Africa. For this reason no attempt has been made to procure a specimen. The pair has clearly become at least temporarily resident in the district, and it is possible that, if left undisturbed, they may breed and become more firmly established.

Both the birds seen were fully adult, as the neck-ring was quite distinct. This species is perhaps the most beautiful of all the East African parrots, the general impression being one of varying shades of green, and a striking carmine bill. The plumage, particularly of the head and mantle, appeared to have a lovely blue sheen, as the birds turned in the sunlight. During all the time that the birds have been under observation, they never ceased calling; their loud and piercing note being very distinctive, and clearly audible from a considerable distance, especially when the bird is on the wing. They did not seem to be noticeably wild, and although staying mainly at the tops of the tallest trees, frequently took short flights at quite a low level. On each occasion, the birds have finally disappeared, always in the same direction, flying high and rapidly, and calling continually.

It appears that the nearest locality hitherto recorded for this species is "between Masindi and the Budongo Forest" (Dr. van Someren, *Nov. Zool.*, 1922). Jackson states that this record extends the range of the species southwards by some 200 miles, and the new record is roughly 2° S., and 5° E., of the locality recorded by Dr. van Someren.

It is possible that the specimens seen should be referred to the race *P.k. parvirostris* Souancé, the distribution of which is given by Sclater as "N. Abyssinia, Eritrea and the Sennar district of the Sudan." The Nairobi area is, however, so far beyond the normal range of either race, that unless specimens are collected, it would be unwise to attempt any more exact identification.

The information on which the above was based, was submitted to the East Africa Natural History Society, and three members, namely, Sir Charles Belcher, Dr. D. G. MacInnes, and Dr. L. S. B. Leakey, have satisfied themselves as to the authenticity of the claim.

OBITUARY.

THE LATE H. L. SIKES, C.B.E. The Society has lost a very valuable and old member in the death of Howard Lecky Sikes. Mr. Sikes met his death whilst doing his duty as Senior Regional Advisor to the Ministry of Home Security. Mr. Sikes will be remembered by most of us as the Director of Public Works and as a long and valuable member of this Society.

His great interest was geology and especially hydrology. His paper on the Hydrology of Lake Naivasha in the *Journal* is still a most valuable reference on that subject. Through the years of his active life in Kenya, he enriched the geological collection of the Coryndon Museum with many valuable specimens. Mr. Sikes wished and I believe would have returned to Kenya after the war to continue his work on the Rift Valley.

He was a most kindly man to deal with; courteous and it was only when one was with him either on Lake Naivasha or in the Rift Valley, that one appreciated his great knowledge on these subjects. The Society has lost a kindly but steadfast Life Member, one of the small band that carried on when things were not too bright with the affairs of the Society or the Museum.

H.C.

THE LATE CANON KENNETH St. AUBYN ROGERS. By the death of Canon Rogers, the Society has lost another of its earliest members. The late Canon Rogers was born in 1869. After a distinguished career at Oxford, he accepted a Curacy at Melton Mowbray and three years later, in 1898, he came to East Africa as a missionary of the Church Missionary Society. He retired in 1926, and settled at Mbagathi.

Canon Rogers joined the Society in 1912, and was for many years a member of the Executive Committee, serving on various sub-committees. He was an enthusiastic lepidopterist and his first paper in this *Journal*, on "Mimicry in East African Butterflies," was published in the first volume. He was associated with Dr. V. G. L. van Someren in the production of the first nine parts of the "Butterflies of Kenya and Uganda," and contributed articles to the Proceedings of the Royal Entomological Society of London, of which Society he was a Fellow. His extensive private collections of Lepidoptera were presented to the Hope Museum at Oxford several years ago.

Canon Rogers was also an authority on roses and collaborated with Capt. K. T. Gooch in writing the chapter on roses in the first edition of "Gardening in East Africa."

With his great knowledge of butterflies, Canon Rogers was always ready to help others and his death after a short illness on January 31st of this year, will be regretted by all who came into personal contact with him.

J.R.H.

THE THIRTY-SECOND ANNUAL REPORT OF THE EAST AFRICA NATURAL HISTORY SOCIETY FOR THE YEAR 1942.

1. *Officers.*—The following members of the Society constituted the Executive Committee for the year in question.—

R. Daubney, Esq., President and Chairman.
H. J. Allen Turner, Esq., Vice-President.
Miss K. E. Attwood, Hon. Treasurer.
Hugh Copley, Esq., Hon. Secretary.
J. R. Hudson, Esq., Hon. Editor of the Journal.
Sir Charles Belcher.
Dr. L. S. B. Leakey.
Mrs. R. Fane.
Lieut. A. F. J. Gedye.
Sat Bachan Singh.

Mrs. R. Fane was obliged owing to excess of other work to resign and so did Sat Bachan Singh. Lieut. Gedye was away on active service the greater part of the year. Mr. F. B. Hannam was elected to the Committee during November. There were eleven meetings and despite the many other preoccupations of members of the Committee, there was never any difficulty in procuring a quoram.

2. *Obituary.*—During the year under review, the Society lost one of its oldest members in Capt. R. E. Dent, who had been closely associated with the Society and had rendered invaluable service to the Colony in many branches of natural history.

3. *Membership and Subscriptions.*—The year was marked by a striking increase in membership; sixty-six new full members were elected and three Institutions joined the Society. Two members resigned on leaving the Colony. As promised in the Annual Report for 1941, a list of members will appear in the next number of the *Journal.*

4. *Finance.*—The Financial Statement for the year has been prepared by the Hon. Treasurer and copies have been distributed to the meeting. From it members will observe that the Society is still able to meet current liabilities, thanks largely to the Museum Trustees who made a grant towards the increased cost of publishing the Society's *Journal*, and to increased revenue derived from subscriptions and sales of publications.

On the disbursements side, it is perhaps as well to draw attention to the largest item of expenditure — that of printing and publishing the *Journal.* The double numbers issued in 1942, cost the Society roughly Shs. 6,000/- against Shs. 7,000/- for three issues in the year 1941. A third double number was in the hands of the printer before the end of the year. The estimated cost of this double number is Shs. 4,000/- plus.

It was only through the generosity of the Museums Board of Trustees that we were able to close the books at the end of the year with a balance to cover commitments incurred in 1942.

5. *Library and Journal Publications.*—During the year Mrs. Copley who acted as Hon. Librarian spent practically the whole of her time cataloguing the books of the Society, those on loan, those belonging to the Kenya Government and those belonging to the Board of Trustees.

Copies of this catalogue have been sent to the Library, Agricultural Research Station, Amani; the Macmillan Library and the Museums Board of Trustees; whilst a copy is available for members in the Library itself.

Several donations of books were received during the year.

Mr. Hudson acted as Hon. Editor of the *Journal* and as already stated he succeeded in producing two double numbers under very difficult conditions; while a third number was in press at the end of the year. The Brochure on "Scavenging Birds" was followed by one on the *Stapelieae* by P. R. O. Bally; the next one will deal with the "Epiphytic Orchids of East Africa.

The sale of these brochures, as weli as other reprints, has been very good during the year, and the figures constitute a record for the Society.

6. *Society's Activities.*—With the helpful co-operation of the Trustees, a Conversazione was again held during the year. Members will be glad to learn that the profits of the Conversazione are being devoted to the purchase of new books for the Library.

A report of the exhibits at the Conversazione will appear in the *Journal.**

Lectures.—A course of nine lectures on Birds was given by Dr. Leakey for the benefit of members of the Society, and a series of school broadcasts was arranged with the Director of Education. The broadcasts were given by Dr. Leakey, Mr. Copley, and Miss Wingfield Digby.

7. *Trustees.*—The continued absence of Lieut. Gedye left Dr. Leakey as the Society's sole representative on the Museums Board of Trustees and in November last, on the Society's nomination, Mr. F. B. Hannam was appointed to act in Lieut. Gedye's place. The Society is most grateful to Mr. Hannam for stepping into the breach.

8. Members will observe that in accordance with the resolution passed at the last Annual General Meeting of the Society, the name of the Society has been changed to the EAST AFRICA NATURAL HISTORY SOCIETY.

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*This report appeared in the last number (page 129).—Editor.

EAST AFRICA NATURAL HISTORY SOCIETY COMPARATIVE CASH STATEMENT, 1941—1942

	1941. Shs. cts.	1942. Shs. cts.
To Balances—		
Anthropological Fund ...	1,000 00	1,000 00
Post Office Savings ...	235 13	265 93
Bank Pass Book	3,917 77	2,464 30
,, Museums Trustees	2,000 00	2,000 00
,, Subscriptions	4,536 20	5,189 00
,, Sales of Journals and Reprints	921 00	1,459 20
,, Donations	24 00	— —
,, Conversazione	185 00	349 30
,, Donations from Museums Trustees towards cost of publishing the Journal ...	— —	1,000 00
,, Miscellaneous Receipts... ...	— —	6 00
Total ...	12,819 10	13,733 73

	1941. Shs. cts.	1942. Shs. cts.
By Museums Trustees	1,000 00	1,000 00
,, Subscriptions to Institutions .	117 00	251 50
,, Printing of Journals	7,017 75	5,970 50
,, Postage	338 90	443 60
,, Refund of Subscriptions overpaid, etc.	— —	201 00
,, Miscellaneous Items	646 02	280 25
,, Balances carried forward—		
Anthropological Fund ...	1,000 00	1,000 00
Post Office Savings Bank ...	235 13	265 93
Bank Pass Book	2,464 30	4,301 85
Balance of Reconciliation Account (see below) ...	— —	19 10
Total ...	12,819 10	13,733 73

RECONCILIATION ACCOUNT.

	Shs. cts.
Cash in hand	40 00
Cheque not presented	20 90
	19 10

(Sd.) K. E. ATTWOOD,
Hon. Treasurer.
East Africa Natural History Society.

NAIROBI,
31st December, 1942.

REPORT ON THE CORYNDON MUSEUM FOR THE PERIOD JULY 1ST TO DECEMBER 31ST, 1942.

By the Hon. Curator.

The promise of a successful year indicated by the results of the first half of 1942 was more than fulfilled.

New exhibits were placed on view each month. These included a second (female) gorilla skeleton, an exhibit of birds nests, new exhibits of fossils of both the Miocene and Pleistocene periods, many new birds, a number of new botanical paintings, an exhibit of the more common beetles of the Nairobi District and many new plaster casts of fish.

Research work was continued right through the year and papers prepared for publication on a variety of subjects. Some of these have already appeared in the *Journal* and others are included in the forthcoming number.

The lectures started at the beginning of the year were continued and at the end of the year prizes were presented to boys and girls from the schools for the best bird essays, based upon the lectures given.

Collecting expeditions in the second-half of the year included a visit to Rusinga Island and another to Olgasalic and many valuable specimens were collected.

The accessions for the year were very satisfactory and were as follows: —

Archaeology	4,115
Botany	673
Ethnology	41
Entomology	8,496
Geology	12
Mammals	115
Marine and Fresh Water Biology	279
Mollusca	581
Ornithology	1,261
Palaeontology	840
Reptiles	29
Sundries	88
Total Specimens ...	16,440

The final figures of visitors for the year were 19,392 adults and 6,145 children, compared with 13,160 adults and 1,926 children in 1941.

The door receipts amounted to £464-14-80.

L. S. B. Leakey.

SUMMARY OF REPORT ON THE CORYNDON MUSEUM FOR THE PERIOD JANUARY 1 TO JUNE 30, 1943.

BY THE HON. CURATOR.

The result of the work in the Museum during the first half of the year 1943 suggests that all previous records will be broken this year.

Exhibition Hall.—The policy of continually adding new exhibits has been maintained throughout the past six months and among other new exhibits special mention must be made of the following:—

(1) A new display of economic sea fish, including baracuda, king fish, dolphin, giant parrot-fish and many others not previously displayed.

(2) Many new mounted birds added to the bird exhibit, including Makinder's owl, golden-breasted starling, spurwing goose, wooly-necked stork, African crake, several species of hornbill, and a large variety of smaller birds.

(3) A further large collection of flower paintings by Mrs. Bally.

(4) New exhibits of fossils.

(5) A habitat group containing the two giant forest hogs.

(6) A special case of rats and mice and another of bats.

Research.—Research has been continued in a number of branches of science and papers embodying this work have been prepared for publication, while others are still in preparation.

Work Rooms.—Considerable progress has been made with the cataloguing of many of the museum study collections and the card index of the bird collection is now up-to-date, while the incorporation of accessions into the entomological collection has progressed satisfactorily, thanks to voluntary assistance by several experts.

Visitors.—The total number of visitors for the first half of the year was 14,593 adults and 6,251 children and the door receipts amounted to £347-4-10.

Accessions.—Accessions for the first six months were very satisfactory.

L. S. B. LEAKEY.

East Africa Natural History Society.

PUBLICATIONS OF THE SOCIETY

Copies of most of the back-numbers of the *Journal* can be supplied at prices varying from Shs. 2/- to Shs. 20/- per copy. Members of the Society are entitled to 20% discount. Reprints of many of the articles that have appeared in the *Journal* are also available and a list is given below.

1.	Stone Age Culture, Mount Elgon	Moysey.
2.	Sedimentary Rocks	Glenday.
3.	Geology of Usongo Area, Tanganyika Territory	Grace and Stockley.
4.	Drowned Villages on the Coast	Sikes.
5.	Bajun Islands	Barton.
6.	Fluctuations of Lake Victoria	Brooks.
7.	Lumbwa Caves	Hobley.
8.	The Organic Cell. Part 1	Wynstone-Waters.
9.	The Organic Cell. Part 2	Wynstone-Waters.
10.	Hydrology of Lake Naivasha	Sikes.
11.	Pluvial Geology, Rift Valley	Reck.
12.	In Search of Telekie's Volcano	——
13.	Lepidoptera	van Someren.
14.	Buprestidae (Coleoptera)	Thèry.
15.	Fresh Water Fishes	Copley.
16.	Diseases of Stock, Lumbwa	Dobbs.
17.	Bat Nursery	Jackson.
18.	Captive Mammalia. Part 2	Loveridge.
19.	Game and Disease	Percival.
20.	The Distribution of Animals	Carpenter.
21.	Chyulu Hill Expedition. Gen. Narr.	van Someren.
22.	Chyulu Hill Expedition. Panoramas only. A.B.C.	van Someren.
23.	Stone Age Cultures	Leakey.
24.	Kipsigis Development	Orchardson.
25.	Religious Belief and Practices of Kipsigis	Orchardson.
26.	Tribal Organisation of the Masai	Hemsted.
27.	Butterflies of the Chyulu Expedition	van Someren.
28.	Chyulu Hill Coleoptera. Part 2	Marshall.
29.	Holacanthus semicirulatus	Copley.
30.	Introduction of Trout into Tanganyika	Grant.
31.	Fishing in the Kavirondo Gulf	Dobbs.
32.	Cestodes in E.A. Mammals, etc.	Hudson.
33.	Reptiles of the Chyulu Hills	van Someren.
34.	Supp. 3. Check List of Reptilia. Shs. 2/-	Loveridge.
35.	Hornbills	Moreau.
36.	Nesting of Uganda Birds	Belcher.
37.	Birds of Turkana	MacInnes.
38.	Migration of Birds. Shs. 2/-	van Someren.
39.	Palm Swifts, Cypselus parvus	Moreau.
40.	Abdim's Stork	North.
41.	Birds of Jubaland and N.F.D.	van Someren.
42.	Birds of Chyulu Hills	van Someren.
43.	Kinangop Sunbirds	Belcher.
44.	Crested Wattled Plover	North.
45.	Wasanye	Champion.
46.	The Bantu of Kavirondo	Cwen.
47.	Kikuyu Land Tenure	Barlow.
48.	African Sign Writing	Hobley.
49.	Luo Marriage Customs	Shaw.
50.	Bride Price, Nandi	Huntingford.
51.	Food Production amongst the Luo	Owen.
52.	Cult of Mombo in Cent: and South Kavirondo	Nyangweso.
53.	History of Nandi till 1850	Huntingford.
54.	Marriage Customs of Kipsigis	Orchardson.

55. Marriage Customs amongst Masai ... ... Storrs-Fox.
56. Masai Social Customs ... ... Whitehouse.
57. Masai Shields and Spears ... ... Storrs-Fox.
58. Origins of Various Tribes (Masai) ... ... Bolton.
59. Botanical Notes (Nos. 1 and 2) ... ... Napier.
60. Botanical Notes (Nos. 49 and 50) ... ... Napier.
61. Palms of Kenya ... ... Dale.
62. Forest Types of Mount Kenya ... ... Dale.
63. East African Succulents. Part 1 ... ... Bally.
64. East African Succulents. Part 2 ... ... Bally.
65. East African Succulents. Part 3 ... ... Bally.
66. East African Succulents. Part 4 ... ... Bally.
67. Nutrient Deficiencies in the Coffee Tree ... ... Beckley.
68. Virus Diseases of Plants ... ... Le Pelley.
69. Kenya Flowers as Garden Plants ... ... Jex-Blake.
70. Notes on Wild Flowers ... ... Napier.
71. Chyulu Hills. Part V. Botany ... ... Bally.
72. Grasshoppers, Chyulu Hills ... ... Uvarov.
73. Skulls and Culture in the Museum ... ... Leakey.
74. Tricholipeurus ... ... Hopkins.
75. Bird Names in Nyanza Languages ... ... Hull.
76. Rift Valley ... ... Gregory.
77. Three New East African Moths ... ... Tams.
78. Chrysomelidae ... ... Gedye.
79. Notes on Charaxes pythodorus ... ... Evans.
80. Mimicry Natural Selection ... ... Carpenter.
81. Lycaenidae ... ... van Someren.
82. Notes on East African Cetoniinae ... ... Gedye.
83. Variation in East African Butterflies ... ... Rogers.
84. Grasshoppers from Kenya ... ... Uvarov.
85. Insect Pests on Coffee ... ... Le Pelley.
86. Fossorial Hymenoptera ... ... Carpenter.
87. Heterocera. Miscellaneous Notes ... ... Townsend.
88. Heterocera. Further Notes ... ... Townsend.
89. Turkana Fauna ... ... Buxton.
90. Psychoda, Chyulu Hills ... ... Tonnoir.
91. Two New Cicindelinae ... ... Horn.
92. Trypetidae. Special Supplement ... ... Munro.
93. Trypetidae. Vol. XIII. No. 5 ... ... Munro.
94. Trypetidae (Chyulu). Vol. XIV. No. 4 ... ... Munro.
95. Volcanological Observations in East Africa ... Richard.
96. Some Speculations on the Coloration of Animals ... Carothers.
97. Names of Birds and Reptiles in Nyanza Languages. Hull.
98. Luo Customs with regard to Animals ... ... Odede.
99. Nesting Habits of the Yellow-breasted Sunbird ... Vanderplank.
100. The Naivasha Fossil Skull and Skeleton ... ... Leakey.
101. Fossil Suidae from Oldoway ... ... Leakey.
102. Heterocera. Further Notes (No. 3) ... ... Townsend.
103. Birds in the Northern Lake Rudolf Area ... ... Lynn-Allen.

All these Reprints are priced 50 cents each with the exception of those priced individually.

All correspondence in connexion with the publications of the Society should be addressed to the

HONORARY SECRETARY,
East Africa Natural History Society,
P.O. Box 241, NAIROBI.

and (except when returning proofs) not to the Editor.

The Honorary Secretary will be glad to receive copies of articles for the consideration of the Journal Sub-Committee with a view to publication.

Journal
OF THE
East Africa Natural History Society
OFFICIAL PUBLICATION OF THE CORYNDON MEMORIAL MUSEUM
(MUSEUMS TRUSTEES OF KENYA)

July, 1944 *Vol. XVII* *Nos. 5 & 6 (79 & 80)*

CONTENTS

Editor: J. RICHARD HUDSON, B.Sc., M.R.C.V.S.

Date of Publication: September, 1944.

Additional copies to members: 7/6; non-members, 15/-.

PRINTED BY THE EAST AFRICAN STANDARD LTD., NAIROBI.

East Africa Natural History Society.

All correspondence in connection with this Journal or the Society should be addressed to the Hon. Secretary, P.O. Box 241, Nairobi, Kenya.

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A POPULAR GUIDE TO SOME OF THE FISHES OF THE CORAL REEF.

By Hugh Copley.

By fishes of the Coral Reef is meant those fish which inhabit and have their environment in or about the coral reef and are found in water from a foot or two to fifteen fathoms deep. There are many fishes not described in this guide which are rare, or will be described in a future publication dealing with the sporting and economic fish of our coastline. That does not mean to say the fish now to be described are not edible—for many are—but generally speaking not one described could be called a "market fish", in the accepted term of the phrase. Some even are poisonous if eaten, others are poisonous at certain periods of the year whilst still others have poisonous roes.

It is also interesting to know that some of these fish actually go to sleep—even lie on their sides—on pockets of sand in or about the lumps of coral. The great majority are gregarious, going about in small shoals and a few seem to be solitary in their habits, but none go about in huge shoals like the pelagic fishes. The majority feed on small fishes, although certain parrot fishes and surgeon fishes are strict vegetarians.

This little publication is intended for those who do not profess to have any knowledge of science; but are keen and interested in these fishes which they see whilst goggling in rock pools, or in the dug-outs of the native fishermen. Latin names, and long scientific family trees have been omitted, but as much knowledge as is known has been crowded in under the description of each fish. There is one word of warning necessary and that is the great majority of the reef fishes have many colour phases; they can also change colour faster and with more diverse effects than any chameleon and the colour fades away upon death until dull blacks and greys predominate. Also during their earlier life the young of the Rock-beauties and Angel fish are very different in colour, to the adults, whilst the very young go through a form completely unlike, in shape and colour, their mature form. The main colour of the young is a pattern of stripes whilst in adult forms these have been replaced by bands or zones of colour of a different hue. To help the reader, where possible, certain fixed characters are given and a note is made of the colour of the young when known. In most cases the description of the colour is made from live or freshly killed specimens so will differ from descriptions made from preserved spirit specimens. Another trouble is distribution, some of these fish are local, but the majority are found all over the Indo-Pacific regions, so the

distribution is given and also the place from which specimens have been secured. Finally, there is a display of these fish modelled by Mr. Allen Turner in the Coryndon Museum which can be consulted before or after a visit to the Coast.

The Long-Snouted Butterfly Fishes. Genera *Chelmo* and *Forcipiger*.

Chelmo rostratus Linnaeus (Fig. 1).

This small fish has a body colour of light yellow-brown. There are four terracotta reddish cross-bands, the first crossing the eye and the last from the soft dorsal to the ventral fins. Each cross band is lined with sky blue. There is a black ocular spot on the dorsal edged with pale yellow. The tail and caudal peduncle are a pale straw colour with one terracotta and one black band on the caudal peduncle. All the other fins and the long snout are of a pale straw colour. Specimens grow to five inches in length.

This fish has a large range along the East African Coastline, the Islands of the Indian Ocean, and all over the South Pacific. Nowhere is it common and the author has no record of its being obtained at any part of the Coast. A coloured picture of this fish is always recognised by the native fishermen so it must come to hand some time.

Forcipiger longirostris (Broussonet) (Fig. 2).

Another small fish with a long snout. The general colour is yellow with a brown tinge. The head is black whilst the chin and breast are ivory white. The tail is a pale blue and the hind edge of the dorsal and anal is edged with Prussian blue. There is a black spot on the anal fin. This fish has a wide range over the Indo-Pacific, but specimens are very rare on our coastline.

The Angel Fishes. Family Chaetodontidae, Sub-Family Pomacanthinae.

Angel fishes and Butterfly fishes are members of the same family Chaetodontidae and a rough and ready method of distinguishing the one from the other is that Angel fishes have a spine on the preorbital or interopercular bones, whilst the Butterfly fishes have a smooth profile on these bones. These two bones form the posterior bones of the cheek. This peculiarity is not quite exact but nearly so.

The Angel fishes are compressed in shape and very thin across the back, for when seen from the front they look like a straight line with two eyes sticking out. They are seldom larger than eight inches in length and the Butterfly fishes not more than six inches. They are quick in movement, flitting about piles and posts or in and out the coral itself.

They apparently rely on a quickness of movement to escape from their enemies. They dart into and hide in the holes and crevices in the coral until danger is past. They are also protected by spines and their depth in comparison with their length makes them a difficult mouthful except to very large fish. The reason for their vivid coloration is not known; it certainly is not for concealment, for their form and colours in the water stand out to a most remarkable extent. Another character is their fearlessness. They seem to go anywhere and everywhere without the slightest fear. Their bump of curiosity is greatly developed, for they will come right up to one's face and sit there in mid-water apparently inspecting one with great interest. They feed on minute crustaceans, worms and other very small animals and browse off fine algae growing on old coral.

Their colour is a feast to the eyes and the fish seem to be able to alter this character at will. For many of these beautiful fish there is no common English name and seldom is there a native name, for the word *kitalangu* is nearly always used collectively or in a separate sense.

Holacanthus imperator Lacépède. The Imperial Angel Fish (Figs. 3 and 4).

This Angel fish grows to an overall length of eight inches. It is easily recognised by its beautiful coloration. The general body colour is a rich blue with a number of bright yellow lines running from the head to the tail. The tail is a bright orange; the pectoral fins are a bright blue; whilst the ventral fins are dark blue with pale blue lines. There is a black band covering the eye and another oblong patch covering part of the hind cheek. These are edged with bright blue. The eye is a bright orange. The snout and the spine on the gill cover is of an ivory white and so are the tips of the dorsal fin. The colour of the young is black with transverse bands on head and sides often with alternate narrow bluish bands. The dorsal and anal fins are usually striped with white and the tail is yellow but not with the bright orange coloration of the adult (see Fig. 4). These fish are not common, few come to hand, and these have been caught in fish traps baited with seaweed.

Its distribution is Indo-Pacific, specimens having been obtained from Mombasa, Zanzibar, Ceylon, Seychelles, and Polynesia. The specimen in the Museum was secured by Mr. A. Klein at Mombasa. The native name is *kitiwaywa*.

Holacanthus chrysurus C. and V. (Fig. 5).

This fish can be easily recognised from *H. semicirculatus* by its bright yellow tail. The main body colour is a deep rich velvety brown becoming paler towards and on the head. There are three broad white bands running across the body, bending abruptly towards the tail and again bending abruptly on the

dorsal fin and to a less extent on the ventral fin. Between each of the broad white bars are narrow white ones. These narrow white lines are absent in the fully adult fish. There is also a white bar on the head just behind the eye whilst there are three blue stripes running between the eye and the snout. The fins are deep brown with the exception of the tail which is yellow.

This Angel fish is seldom seen although believed common. It rarely grows much more than six inches in length.

Distribution: Zanzibar, Dar es Salaam and Mombasa, but this distribution may be much wider when more collecting has been carried out.

Holacanthus annularis Block (Fig 6).

This is easily recognised by the position of the blue bands. The general body colour is a yellowish brown with a dark centre on each of the scales. There are six or seven curved bands of blue colour running from the pectoral fin right across the body of the fish to the dorsal fin and to the tail. There is a blue annulus on the shoulder. Two blue lines run from the profile; one across the eye and one just below the eye to the edge of the gill plate. The tail is yellow.

The young are believed to be striped like *H. imperator*. The distribution of this rare fish is Ceylon, East Indies, and the East African Coastline.

Holacanthus striatus Cuvier (Fig., 7).

This is a very dull-coloured Angel fish. The main colour of the adult is dark brown whilst each scale has a black centre. The tip of the pectoral fin is black whilst the dorsal, anal, and caudal fins are jet black. The young are black with a number of transverse broad and narrow white bars. All fins are either black or edged with black whilst the tail is pale lemon yellow clouded with dark grey. The highly-striped young may be confused with *Holacanthus semicirculatus*.

Although specimens have been caught at Mombasa, Malindi, and Wasim Island, yet the main home of this fish is the Red Sea, for it is most abundant at Port Sudan and Suakin.

Holacanthus maculosus Cuvier. The Yellow-Saddled Angel Fish (Fig. 8).

This is one of the larger Angel fish growing to as much as nine inches in overall length. It can be recognised by the protruding teeth and the long waving points of the dorsal fin. The adults are a rich velvety-brown with a few black spots on the shoulder and forehead. The orange saddle runs from the tip of the soft dorsal fin and then across the body to the anal fin. The whole band is behind the origin of the anal fin and in this differs from *Holacanthus asfur*. The tail is orange yellow. The young

have twelve narrow irregular blue streaks crossing the body and also a pale yellow saddle. The anal has a number of blue curved stripes disposed all over its surface.

The specimen in the Museum was collected from Mombasa by the author. This again is a Red Sea fish with a dispersal along the coast of East Africa and Zanzibar.

Holacanthus semicirculatus Cuvier. The Sacred Angel Fish. (Fig. 9).

This is by far and away the most common of our Angel fishes, reaching a maximum length of nine inches. Old specimens are a brownish-grey with a series of black spots all over the body. The dorsal, anal and caudal are a deeper colour tone with short broken-up white bars. The very young and up to seven inches fish are black with a series of broad and narrow white bars running across the head and the body. The tail has cross white bars and a number of broken-up dots and splashes which sometimes form an Arabic quotation. See *East Africa Natural History Society Journal*, **12**, Nos. 51 and 52, for a fuller description. This fish is widely distributed all over the Indo-Pacific. The native name is *gangue*.

The specimen in the Museum was collected from Mombasa by the author, but it has been collected at Dar es Salaam, Zanzibar, Seychelles, Aden, and Malindi, and is common in the Red Sea.

Holacanthus asfur Forskal (Fig. 10).

This Angel fish can be confused with the yellow saddled Angel fish (*Holacanthus maculosus*) as both have a yellow saddle. In this fish, the yellow saddle is *before* the anal fin and covers part of the pectoral fin. Also the dorsal and *anal* fins have streamer tails. The fish is a rich brown, shading darker posteriorly until the colour merges into black on the anal and dorsal fins. The head has a spotted effect owing to there being a black centre on each scale and the tail is chrome yellow in colour.

Although the range of this fish is a wide one yet its main concentration is the Red Sea, Arabian Coastline, British Somaliland, down the East Coast of Africa to Pemba, and perhaps still more southerly. It is a large Angel fish generally swimming in twos or threes round and in and out of the nigerheads and coral piles.

Holacanthus trimaculatus Cuvier (Fig. 11).

This Angel fish has a general body colour of bright yellow ranging to bright orange. The centre of each scale has a pearl-coloured spot. There is a small black spot on each side of the nape of the head ringed with a thin yellow circle and a large black spot, edged with white, on the shoulder just behind the gill cover and just under the lateral line. The fins are a pale yellow in colour, but the outer half of the anal fin is jet black.

The lips are blue black. This fish can be easily recognised by its bright yellow colour, the spot on the shoulder and the black edging to the anal fin.

Its distribution is Indo-Pacific and specimens have been taken at Zanzibar, Seychelles, and Mauritius.

Holacanthus diacanthus Boddaert (Fig. 12).

The general body colour is a pale yellow ranging to rich orange on the back. There are nine or ten white bands running vertically across the body and each band is edged with black. The breast is a pale pink and the lips orange. The anal is ochre colour with four or five bands of pale blue. The other fins are a pale yellow, but the hind part of the dorsal is black with blue spots on it. The tail is a bright yellow. There are two black-edged, pale blue stripes running from the nape to, and encircling, the eye.

This Angel fish is most variable in the number of its stripes, their shape and arrangement. The young are also most variable.

The distribution of this fish is very wide ranging all over the Indo-Pacific in its fullest extent whilst specimens have been obtained at Zanzibar, Mombasa, and from the Red Sea.

Holacanthus multispinis Playfair (Fig. 13).

This Angel fish is a uniform silky brown colour with numerous black bands along its side. There is a black patch edged with pale blue, on the shoulder. The dorsal has three black bands on a rich brown base whilst the anal has the black bands and also a bright blue edging. The caudal is also edged with bright blue. The colour of the pectoral fin is a dense black. So far the only specimens have been obtained from Zanzibar, Seychelle Islands, and Ceylon.

The Butterfly Fishes or Rock Beauties. Sub-Family Chaetodontinae.

Chaetodon trifasciatus (Fig. 14).

The main body colour is a dull salmon-yellow; with a number of brown-red lines running from head to tail. There is a black band from the nape, across the eye, and then to the lower head line. The snout is dusky. The back is light blue as also is part of the tail, the whole of the caudal peduncle and the hinder part of the body. There is one black band between two bright yellow bands on the tail. The dorsal fin has the spines a bright yellow and the soft dorsal is yellow; then a black band, then yellow; then a thin black band; then yellow and then a vivid orange red. The lines on the anal are thin yellow; then curved black; then thin yellow; then rich yellow orange then a pale yellow tip.

It is really impossible to describe this most glorious fish, but if the above description is compared with the figure, the reader should identify a specimen.

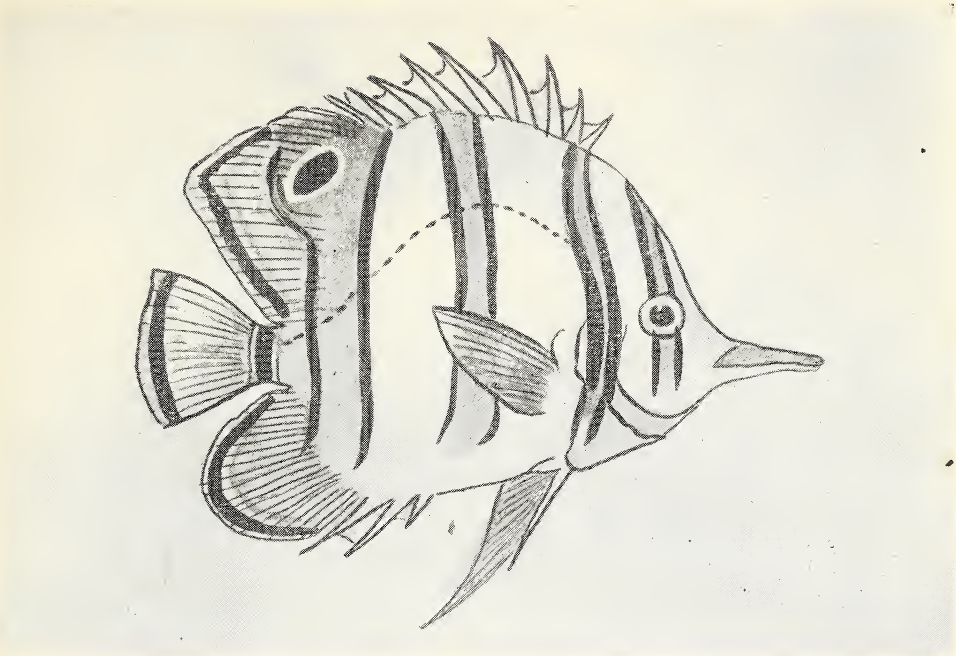

Fig. 1. *Chelmo rostratus.*

Fig. 2. *Forcipiger longirostris.*

PLATE 58.

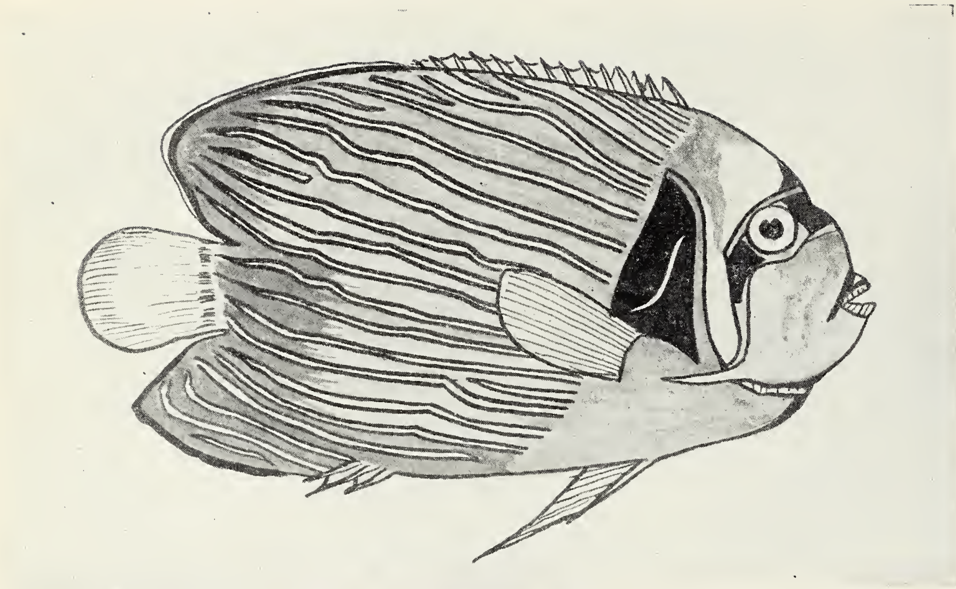

Fig. 3. *Holacanthus imperator*.

Fig. 4. *Holacanthus imperator* young after Fraser-Brunner.

PLATE 59.

Fig. 5. *Holacanthus chrysurus.*

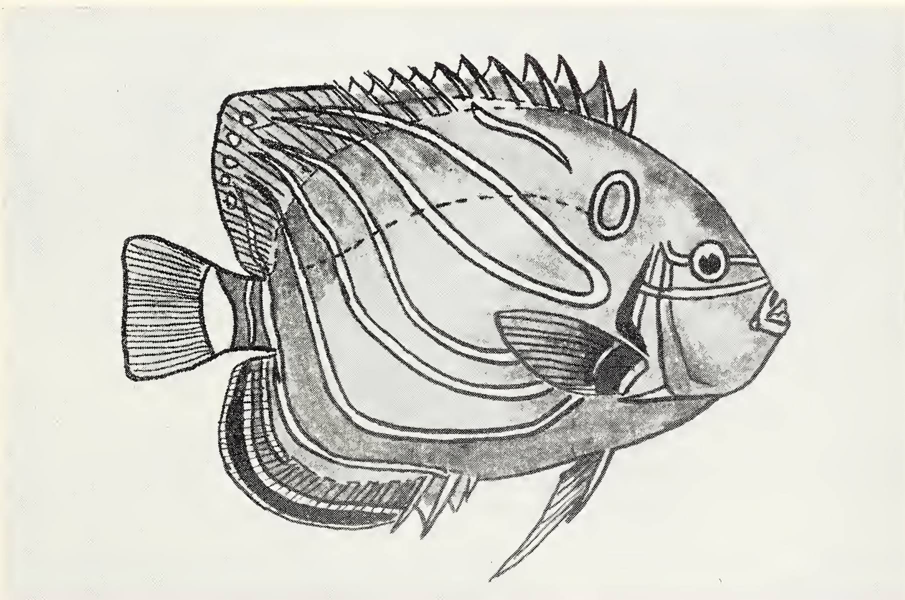

Fig. 6. *Holacanthus annularis.*

PLATE 60.

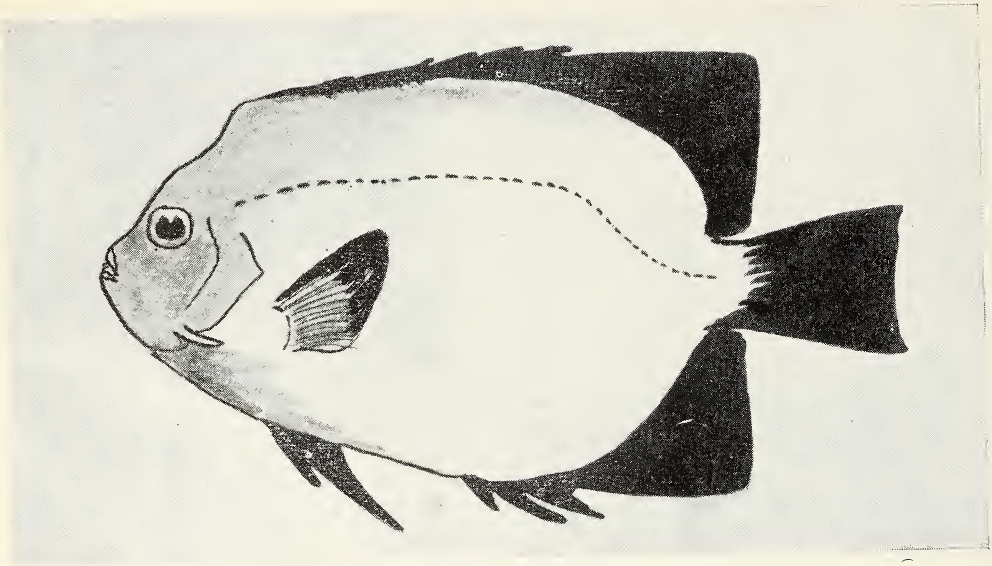

Fig. 7. *Holacanthus striatus.*

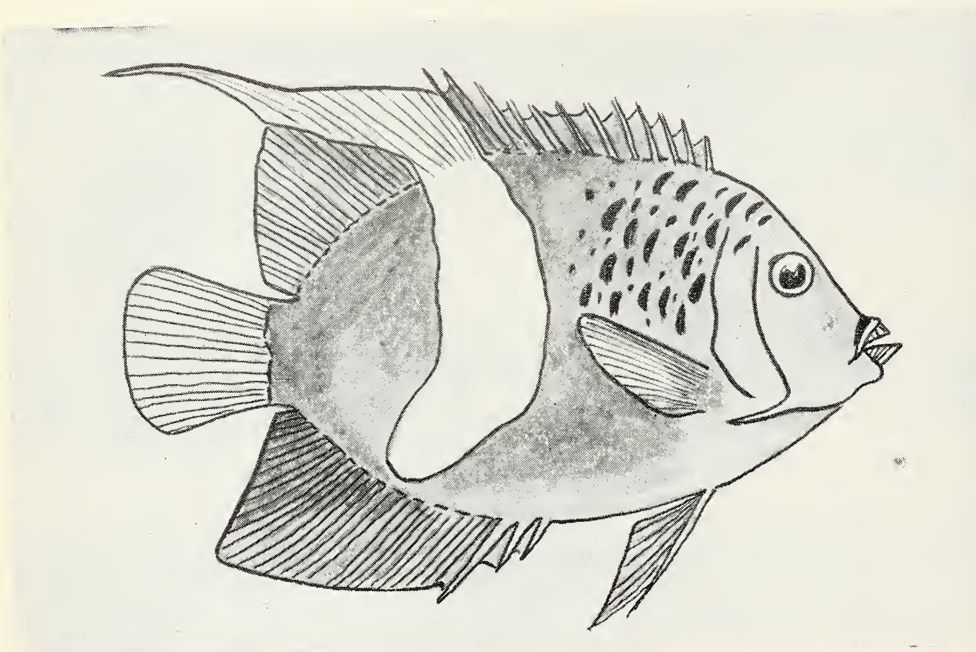

Fig. 8. *Holacanthus maculosus.*

PLATE 61.

Fig. 9. *Holacanthus semicirculatus.*

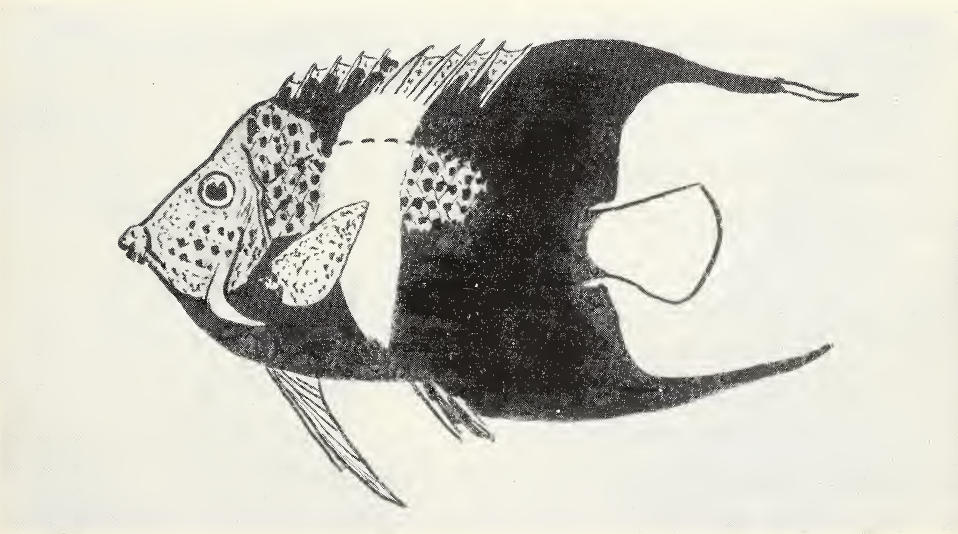

Fig. 10. *Holacanthus asfur.*

PLATE 62.

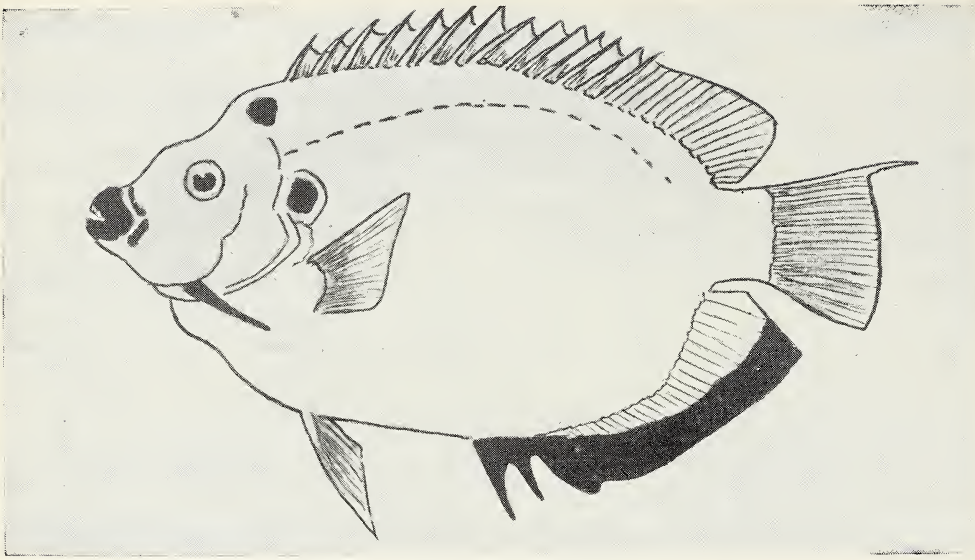

Fig. 11. *Holacanthus trimaculatus.*

Fig. 12 *Holacanthus diacanthus.*

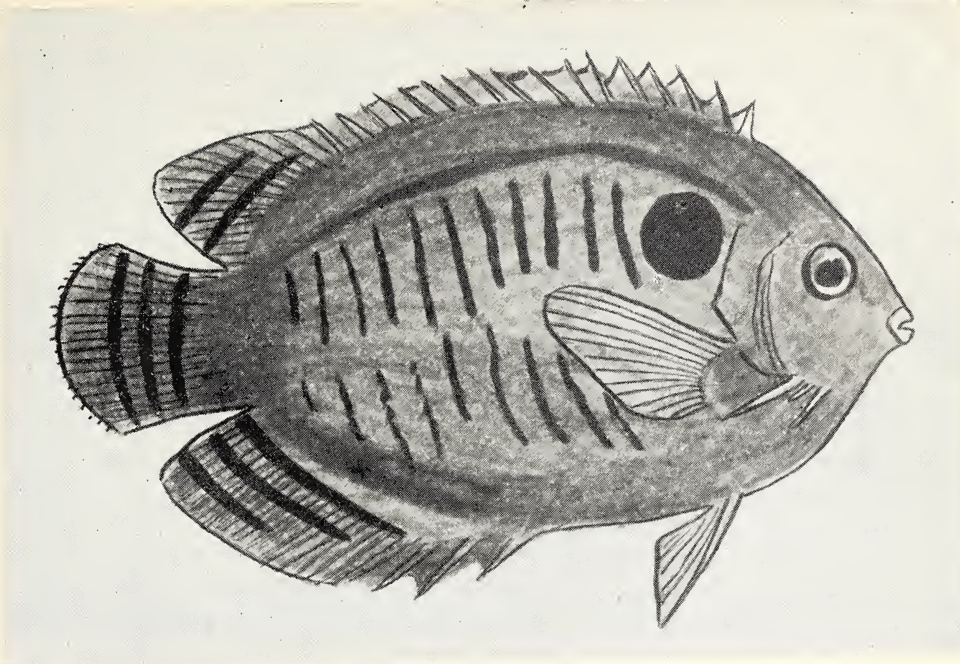

Fig. 13. *Holacanthus multispinis.*

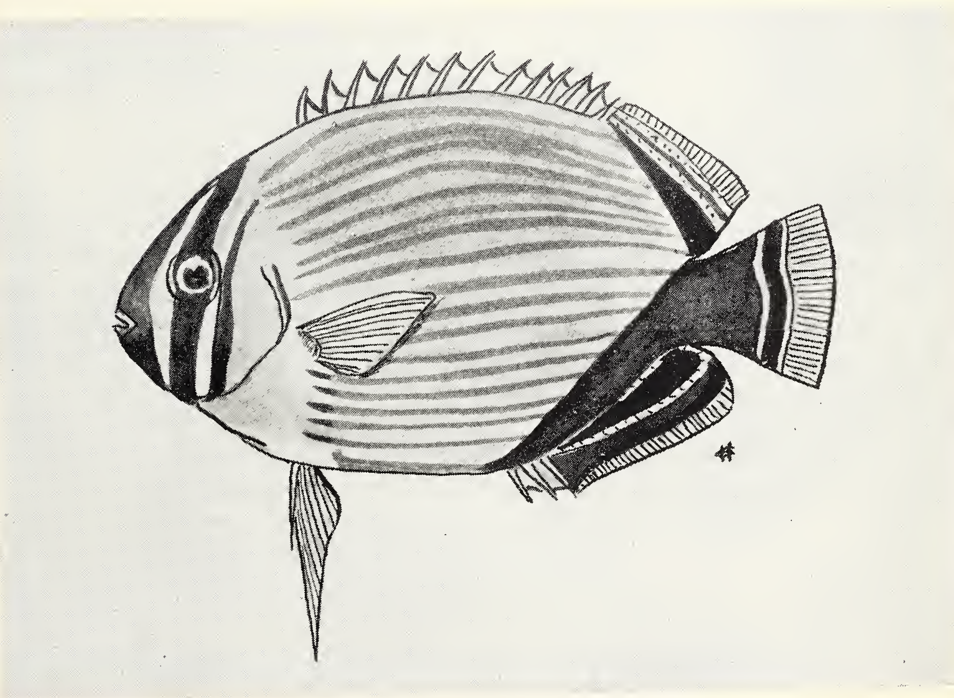

Fig. 14. *Chaetodon trifasciatus.*

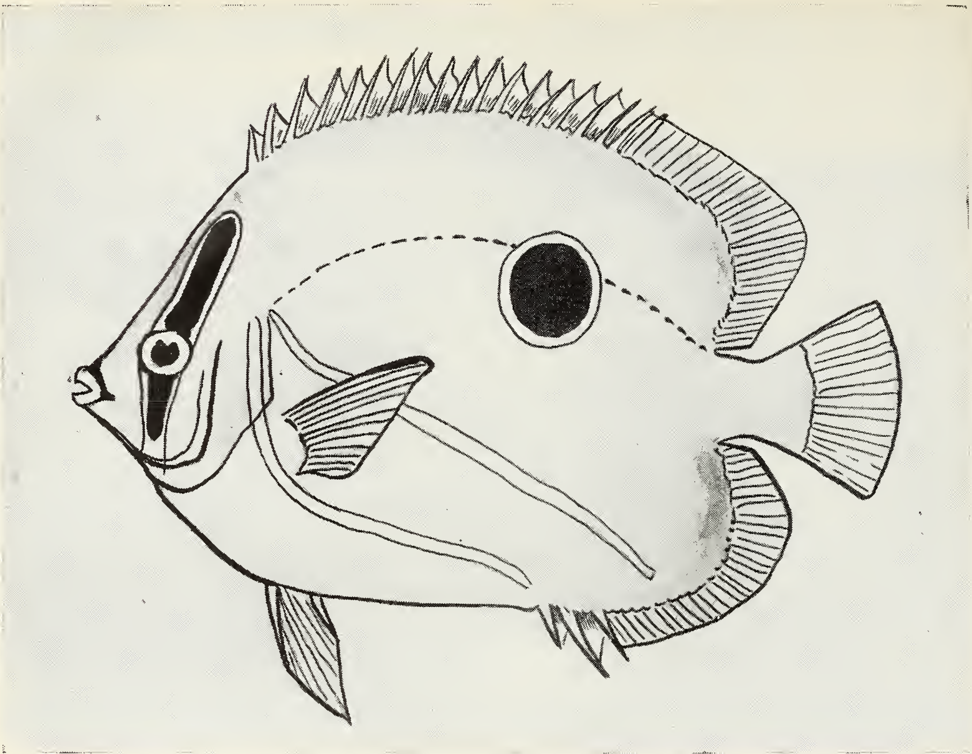

Fig. 15. *Chaetodon bennetti.*

Fig. 16. *Chaetodon speculum.*

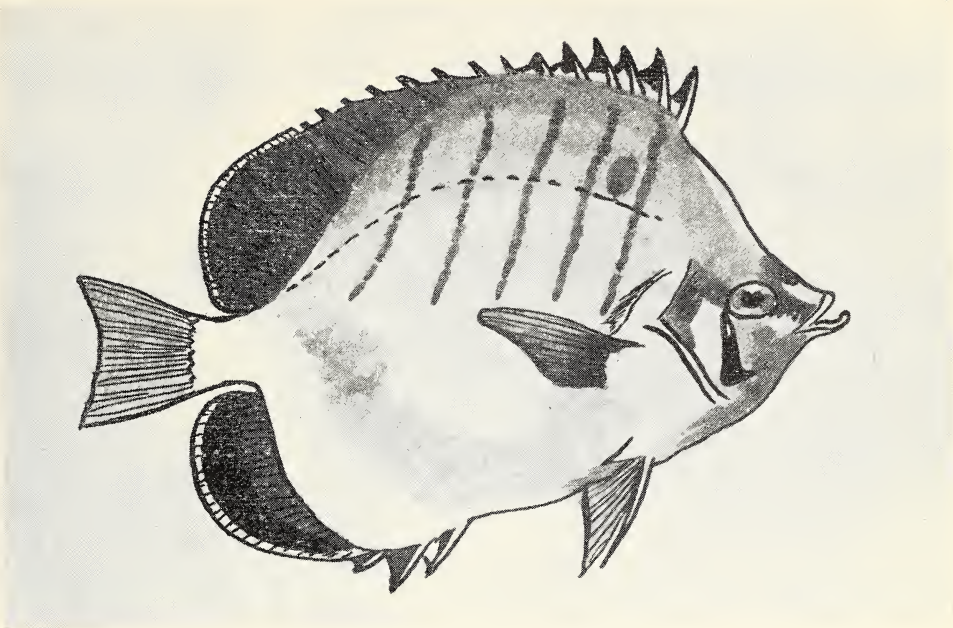

Fig. 17. *Chaetodon xanthocephalus.*

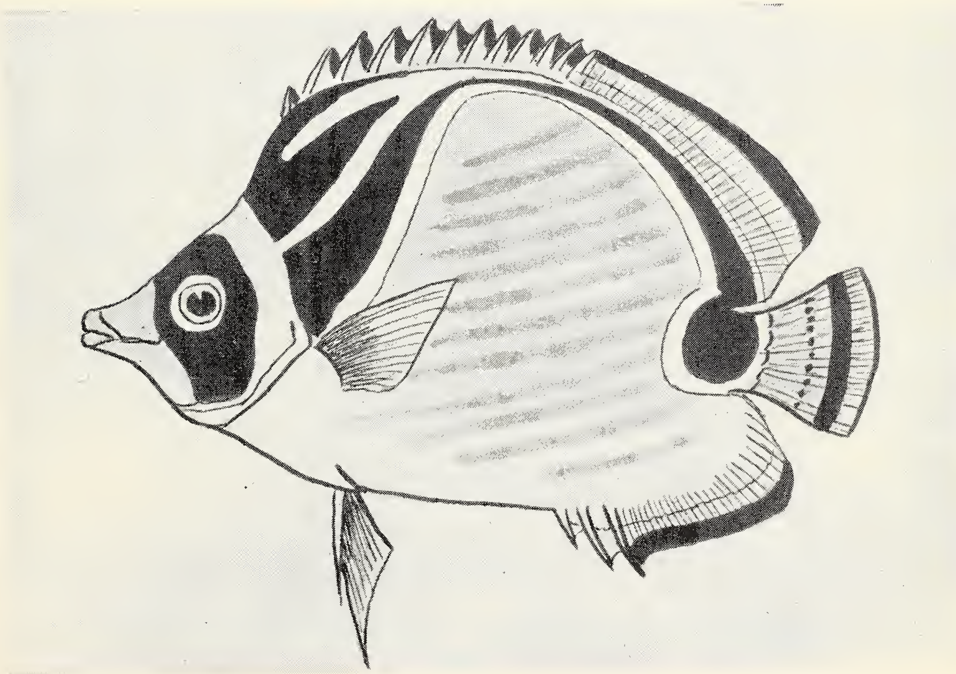

Fig. 18. *Chaetodon fasciatus.*

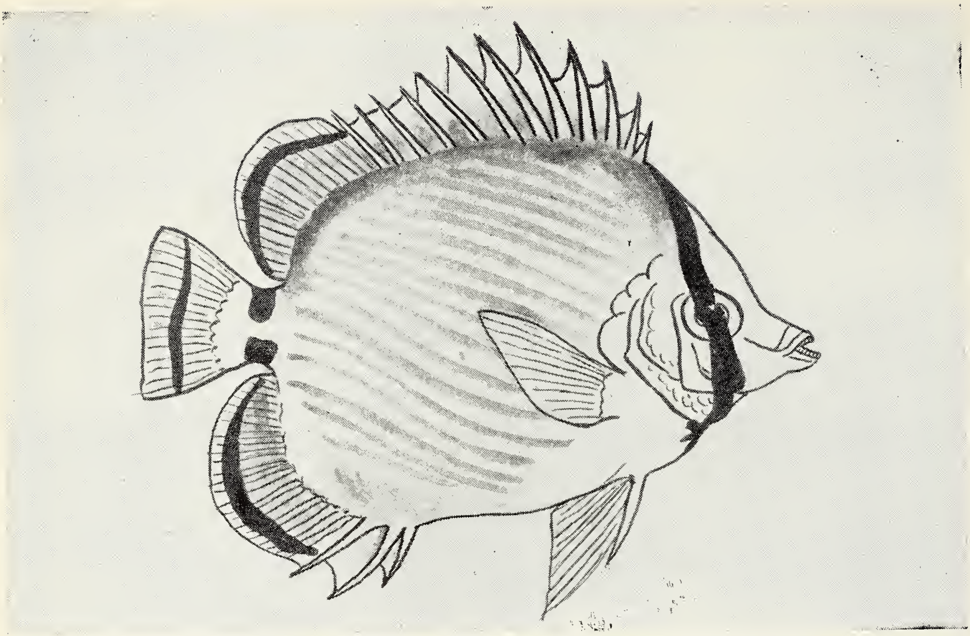

Fig. 19. *Chaetodon melanotus.*

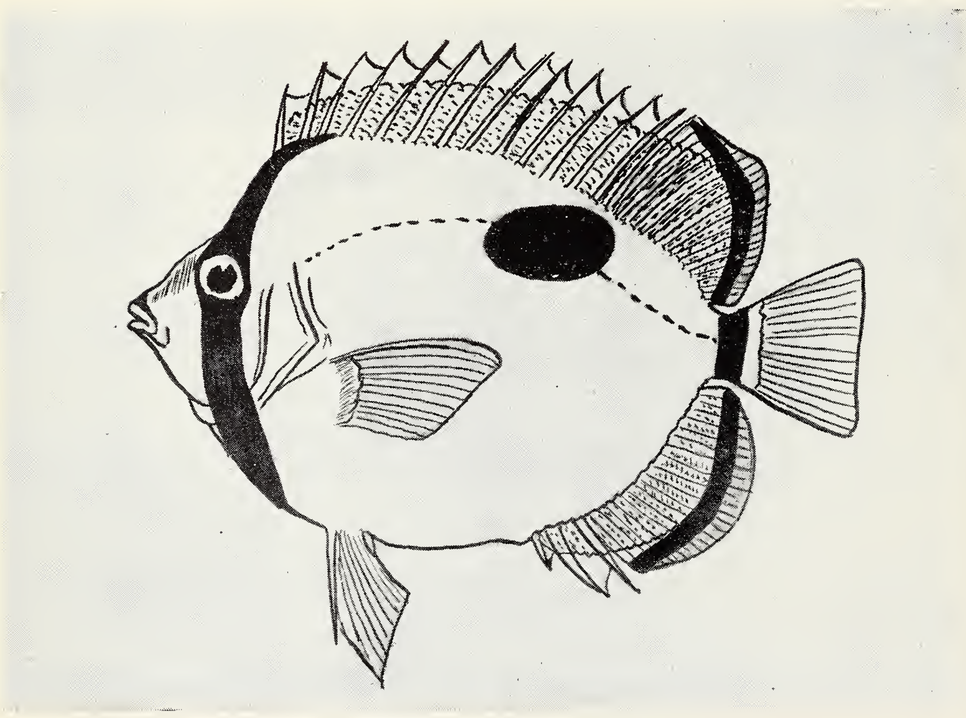

Fig. 20. *Chaetodon unimaculatus.*

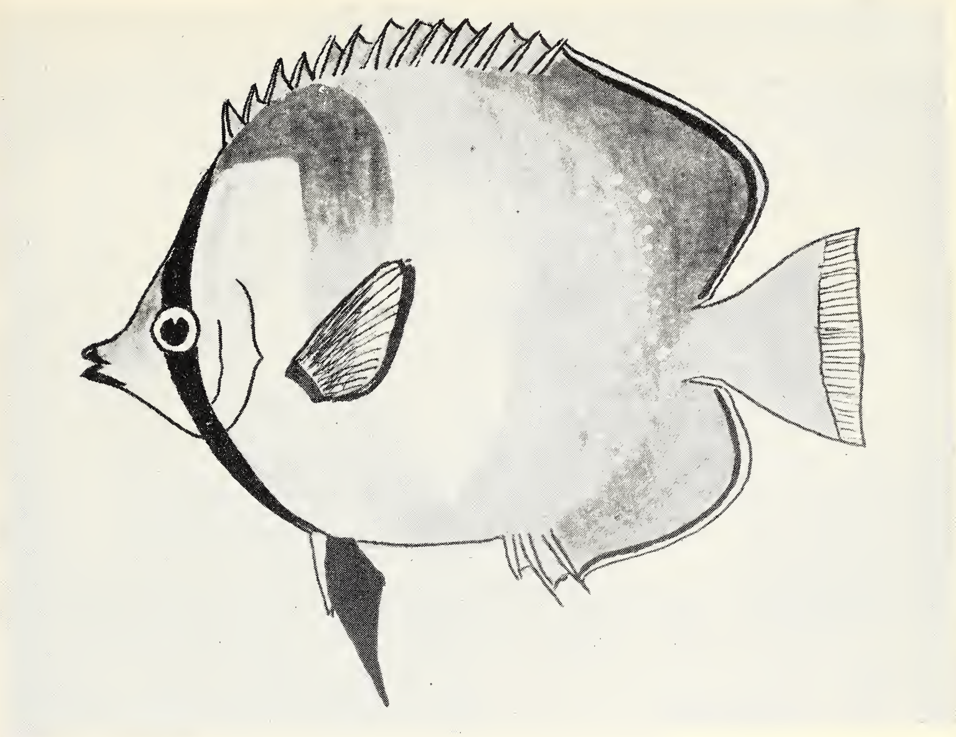

Fig. 21. *Chaetodon kleinii.*

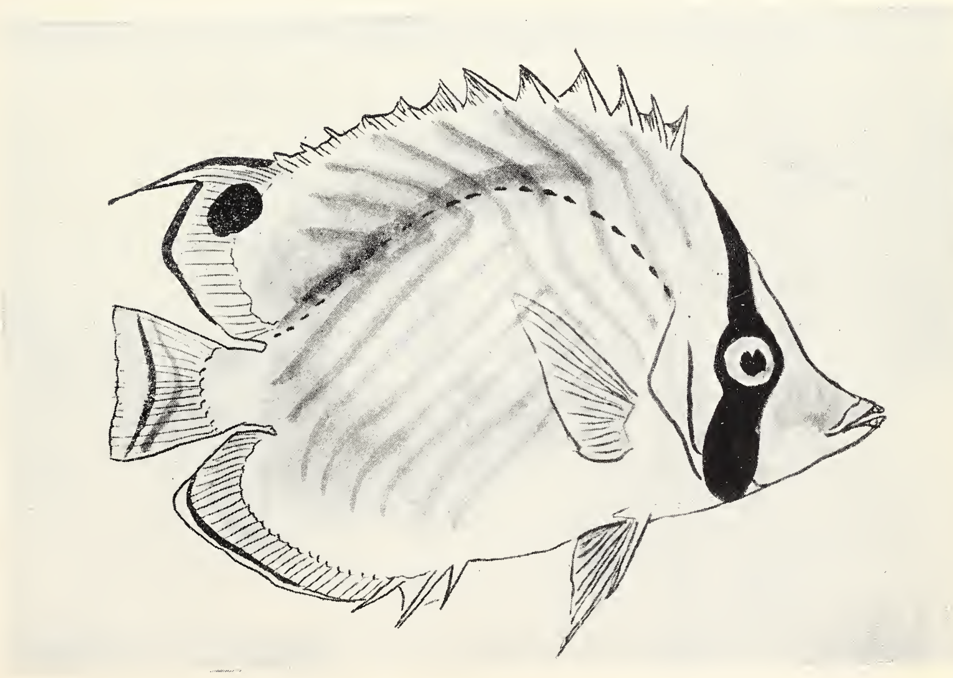

Fig. 22. *Chaetodon setifer.*

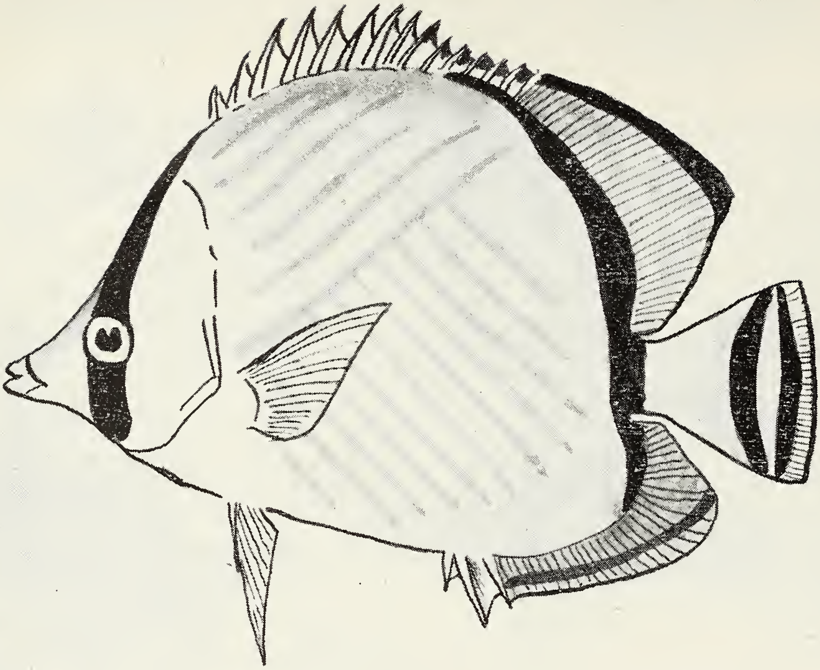

Fig. 23. *Chaetodon vagabundus.*

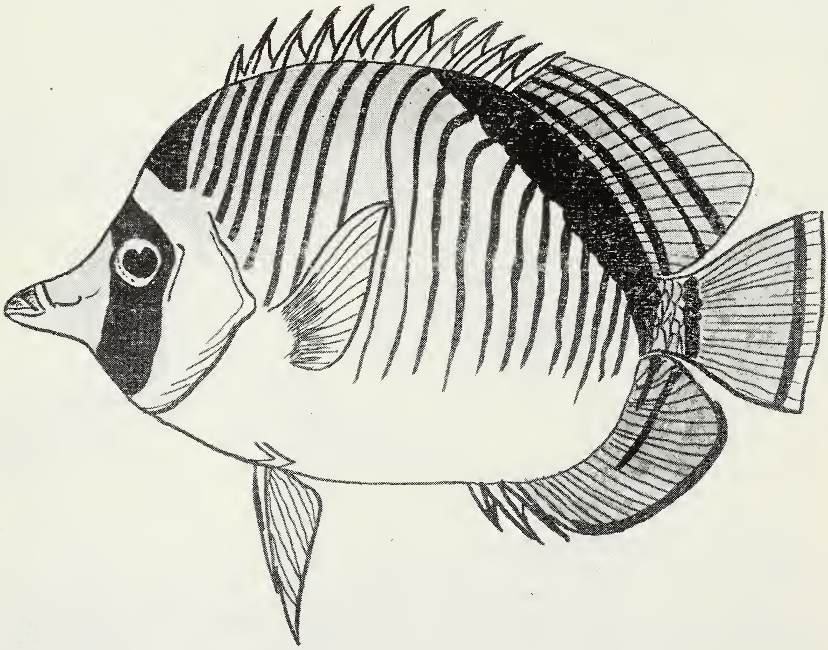

Fig. 24. *Chaetodon lineolatus.*

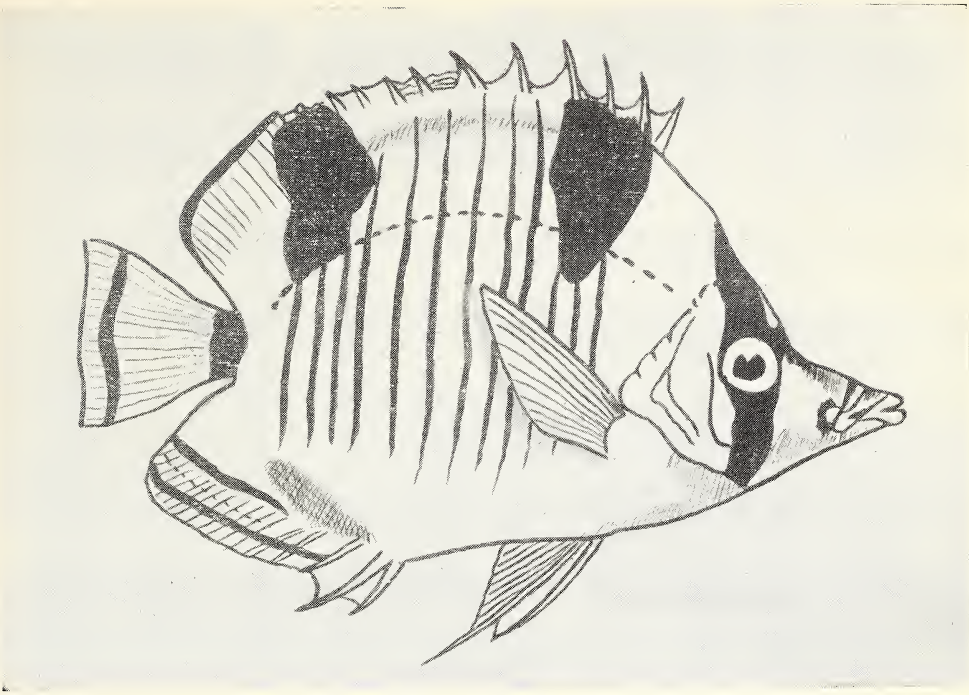

Fig. 25. *Chaetodon falcula.*

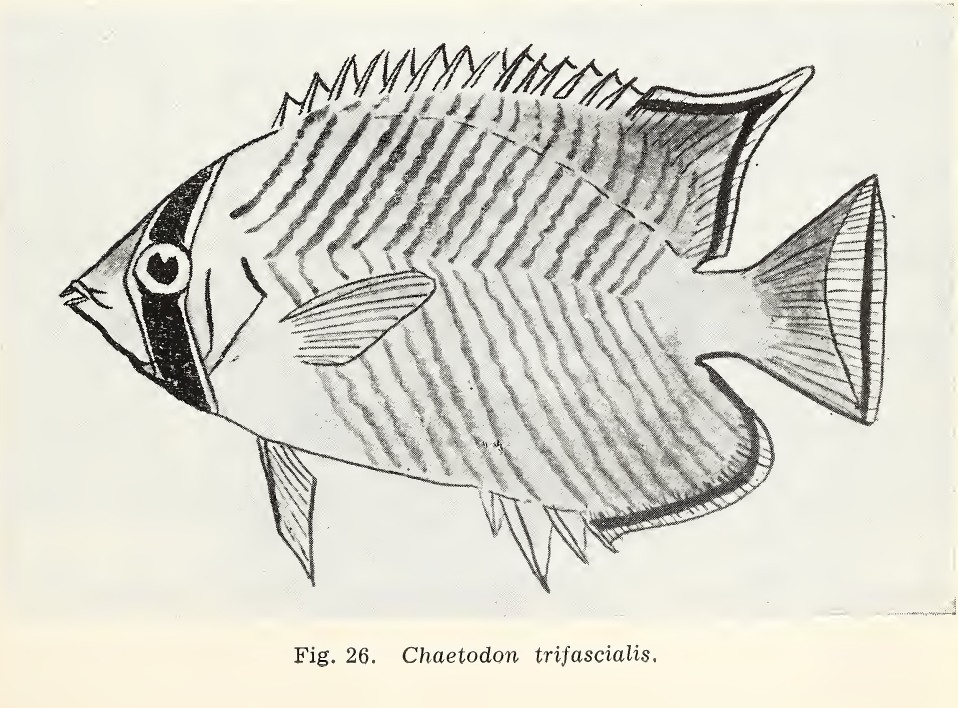

Fig. 26. *Chaetodon trifascialis.*

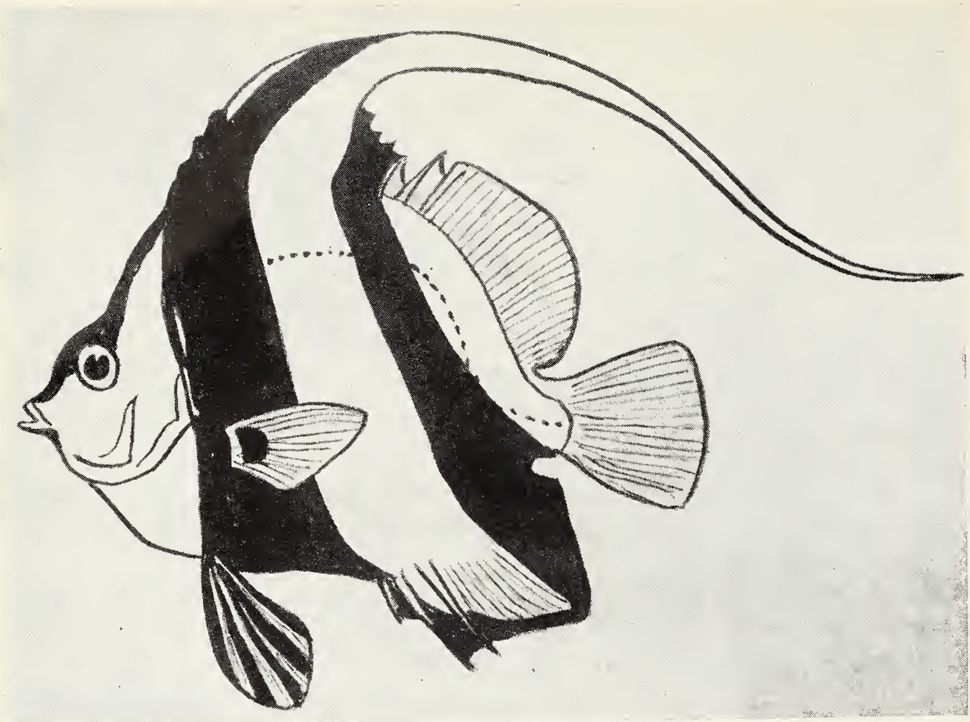

Fig. 27. *Heniochus acuminatus.*

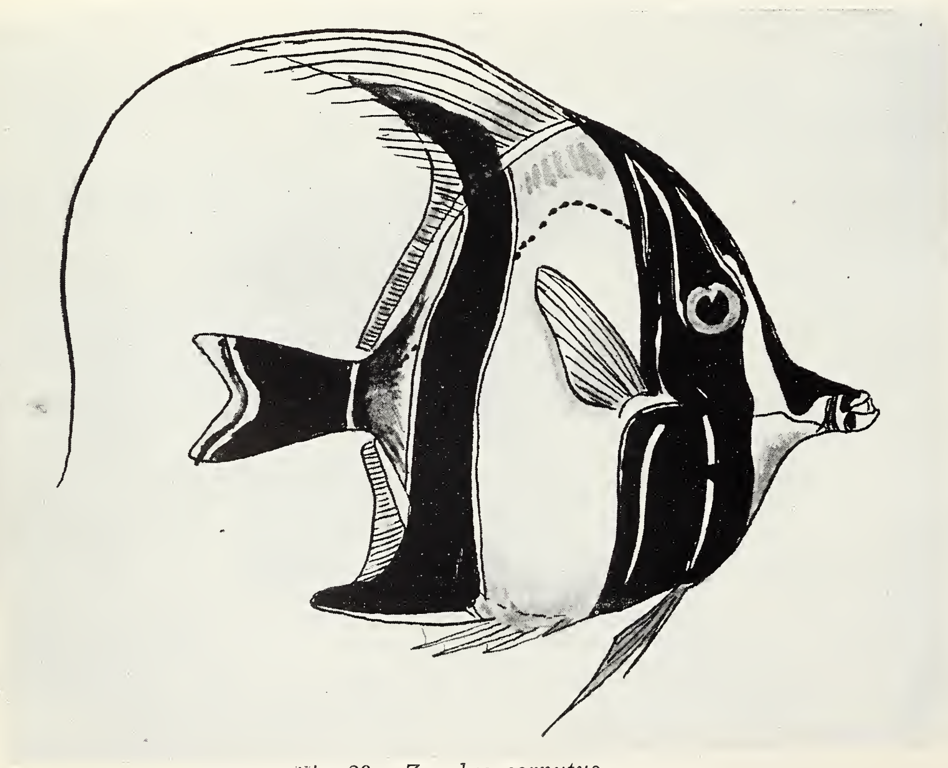

Fig. 28. *Zanclus cornutus.*

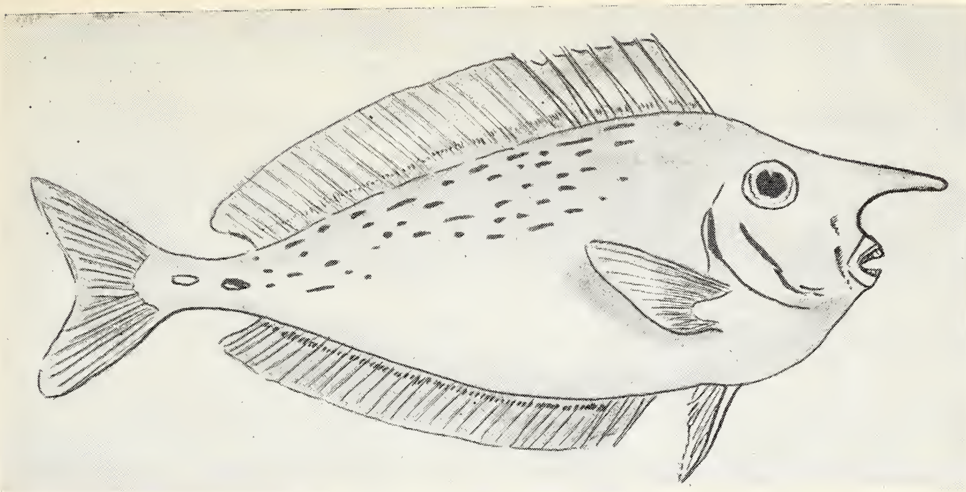

Fig. 29. *Naso brevirostris.*

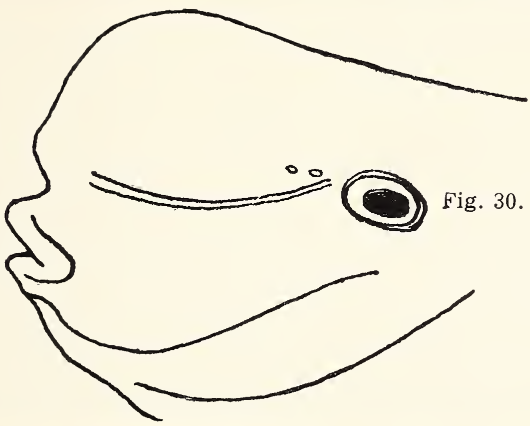

Fig. 30. Head of *Naso tuberosus.*

Fig. 31. *Acanthurus triostegus.*

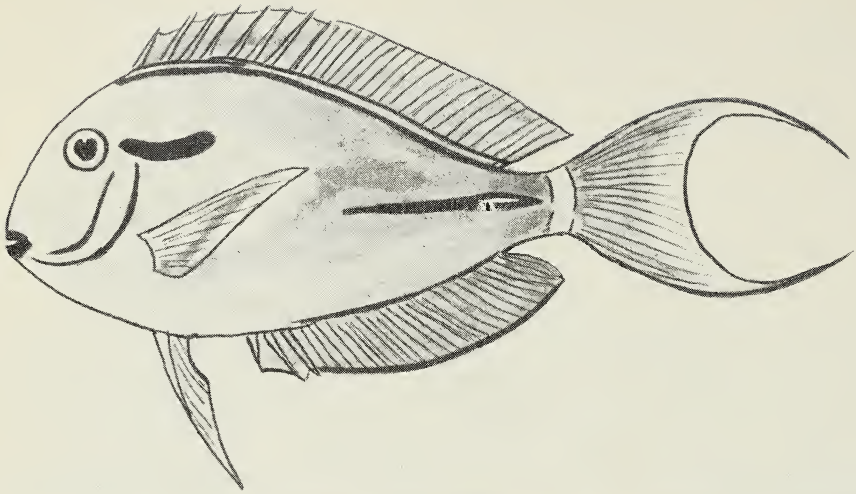

Fig. 32. *Acanthurus gahm.*

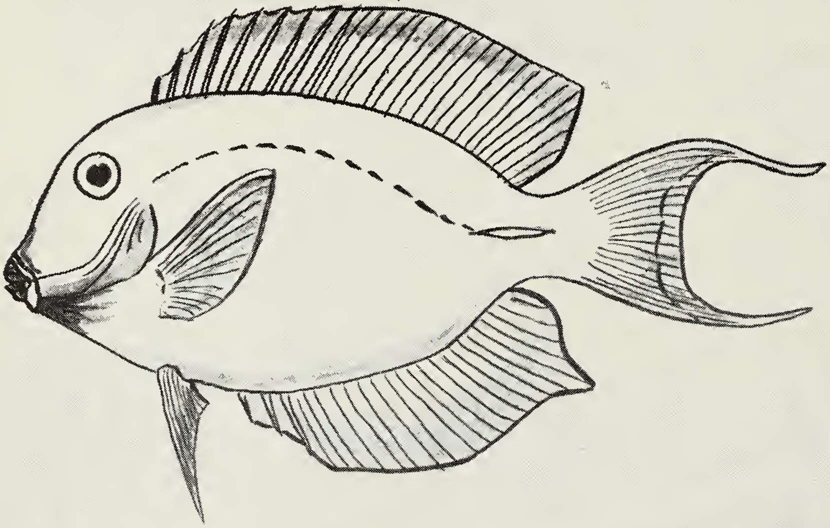

Fig. 33. *Acanthurus leucosternon.*

Its range is all over the Indo-Pacific; the Red Sea, Madagascar, Portuguese East Africa, and the East African Coastline. It is quite abundant at Malindi, Lamu, Mombasa, and Gazi Bay.

In size, it ranges to six inches, but the average specimens would be about four inches in length. The colour is very constant throughout life and also between individuals.

Chaetodon bennetti (Fig. 15).

The general body colour is yellow with the throat and breast a bright lemon. There is a deep brown, edged bluish-white, bar from the nape across the eye and on to the edge of the gill plate. There are two brownish stripes that start just behind the eye and run in a curve to the anal. There is a jet black ocellus edged with pale blue on the hinder part of the body just touching and below the lateral line. The fins are pale yellow; the anal is tipped with cadmium; the pectoral has a cadmium base and the tail often has a cadmium bar. This Butterfly fish is widely distributed all over the Indo-Pacific regions and has been reported from Zanzibar and Mikindani.

The colours are fairly constant and the changes of colour taking place with age are slight.

Chaetodon speculum (Fig. 16).

The general ground colour is a sulphur-yellow and the lips and snout are orange. There is a large dusky patch on the hinder part of the body right across the lateral line. There is a jet black stripe from the nape, across the eye, and right down to the lower edge of the throat. The eye is a bright golden colour. All the fins are a pale yellow with dusky patches situated here and there. The ventral is, however, a vivid sulphur-yellow in colour.

This is a small Butterfly fish not growing to more than four inches in length. Its distribution is Indo-Pacific, but a specimen has been reported from Zanzibar.

Chaetodon xanthocephalus (Fig. 17).

This fish is not highly coloured being brownish with six indistinct dark vertical streaks. The dorsal and anal fins are violet edged with white whilst the caudal and ventral fins are yellowish.

The distribution of this fish is East Africa (Zanzibar, Mikindani, and Mozambique), India, and Ceylon.

Chaetodon lunula or *C. fasciatus* (Fig. 18).

The back is a rich brown olive changing through an olive golden colour to a bright lemon yellow on the breast. From the gill plates, running up to the dorsal fin, there is a big black mark strongly edged with a real hot orange colour. From the tip of this mark a broad yellow line runs back to the base of the

tail, the end of this line makes a question mark. It is edged with black. There is a big black blotch on the body high up near the soft dorsal. There is a wide, black band across the eye tapering to a point at the bottom edge of the gills. The lips are crimson; this merges into a deep yellow ground and then into a white band. There is a big patch of white on the nape of the neck. The soft dorsal is bright yellow, then a red orange, then black; the soft anal is bright red, bright yellow and then black tipped. The tail has a bright yellow base colour with a bright red band, a black band and a pure white edging. On the breast and across the body is a series of subdued bright red stripes, and also some red dots on the yellow breast.

This is a large, dashing and gloriously-coloured Butterfly fish with a wide distribution all over the Indo-Pacific. It has been obtained at Malindi, Kilifi, and Gazi Bay; also Dar es Salaam and Zanzibar. There is a fine specimen in the Coryndon Museum collected at Mombasa.

Specimens are most variable in coloration and so are the younger forms of the adults.

Chaetodon melanotus (Fig. 19).

The main body colour is a mixture of light pink and blue, fading out on the edges of the body, all fins, nose and the tail to a bright yellow. There is a thin dusky stripe running from the nape across the eye and then to the lower edge of the throat. There is a small black spot on the caudal peduncle. There is a series of blue-black stripes and dots, diagonally across the body.

This is quite a common Butterfly fish and is found from the Red Sea, along our own coastline to Zanzibar, India, and the whole of the Indo-Pacific. The colours are fairly constant both in the adult and in the young forms.

Chaetodon unimaculatus (Fig. 20).

The whole of the body colour is a dirty pale yellow. There is a very broad black line running from the nape of the neck, crossing the eye and finishing at the lower edge of the throat. There is a big black blotch set squarely on the lateral line and a black band on the base of the tail. The edge of the soft dorsal and anal fin have a black band edged with bright blue. All the other fins are a pale dirty yellow colour like the body.

This sober coloured butterfly fish is found all over the Indo-Pacific and specimens have been obtained at Zanzibar.

Chaetodon kleinii (Fig. 21).

The body colour is a pale yellow merging into a yellow brown for the posterior half of the body. This portion of the body has a number of white spots scattered all over it. There is a reddish brown band from the shoulder right across the body. The tail is bright yellow edged with pale blue. The snout is black with a red-

dish tinge whilst there is a black band from the nape of the neck covering the eye and running to the throat. The ventral fin is jet black; the pectoral fin is plum colour with a black band at the base. There is a pale blue and black edging to the soft dorsal and anal fin. This is quite a common species found all over the Indo-Pacific regions. Specimens have been collected at Zanzibar.

Chaetodon setifer (Fig. 22).

The body colour is a pure white shading into pale yellow then into rich orange towards the hinder part of the body. There is a dense black ocellus on the soft dorsal which also has a black edging and a hot orange tip. The soft anal has a black line near its edge. The tail has a narrow bar of red; then yellow, red and then pure white. There is a broad black band across the eye. There are a number of pale bluish coloured lines running across the body in two groups. The lips are orange.

This fish is widely distributed all over the Indo-Pacific regions. It is very common all along the East African coastline and is eaten by the natives. When goggling this fish will come up close to the goggles and simply hang in the water staring at one. There is a specimen exhibited in the Coryndon Museum, collected at Mombasa. The native name is *kitalangu*.

Chaetodon vagabundus (Fig. 23).

The body colour is silver grey tinged with pale yellow with a number of green-grey stripes set in two series at right angles to each other. There is a black line from the nape of the neck through the eye to the lower line of the throat. The soft dorsal is a brilliant orange with a broad black bar at its base and jet black tips. The anal is also a rich orange with a thin black stripe. The tail is a lemon yellow with two black bars and pale blue edging.

This is a common Butterfly fish with a very wide distribution from the Red Sea, down our coast to Zanzibar, Madagascar, and all over the Indo-Pacific. There is believed to be very few colour variations between individuals and between the young and the adult stages.

Chaetodon lineolatus (Fig. 24).

The body colour is a silver grey toned with a pale plum colour which is darker on the snout and towards the posterior half of the fish. There is a wide black eye band and a black patch on the body adjoining the soft dorsal fin. The soft dorsal is a rich yellow colour striped with a rich blue line, then a bright red stripe then another rich blue stripe. The soft ventral is a pale lemon colour with a pale blue edging then a rich blue stripe and a blue stripe across the caudal peduncle. There is also a blue stripe across the protruded snout.

This is one of the larger Butterfly fishes growing up to six inches in size and is most widely distributed. It is a very common species in the Red Sea and all down the East African Coastline to Madagascar and Delagoa Bay. Its range extends all over the Indo-Pacific.

Chaetodon falcula Block (Fig. 25).

This is one of the *Chaetodon* with a pronounced snout armed with tiny protruding teeth. The general body colour is a rich brown fading to pale yellow on the belly. There is a broad black band across the eye extending to the lower gill cover. There is one large jet black blotch on the shoulder extending onto the front spiny dorsal and another extending from the lateral line to the beginning of the soft dorsal. There is also a black band on the caudal peduncle. There are a variable number, generally seventeen, of dark thin brown lines extending in a vertical fashion across the body. The dorsal, anal and tail are edged in pure white backed by a black thin line. On the anal there is a second brown band. The background colour of all the fins is a pale lemon colour. On the protruding snout there are several blue and white lines. The young closely resemble the adults.

This is a well-known fish and although not common off our Coastline, yet is very common on the late Italian Somaliland Coastline. It is found in the Red Sea, caught off several places on the East African Coastline, Mozambique, Mauritius, India, Nicobar Islands, and the whole of the East Indies. The average length of the few specimens seen by the author would be five inches long.

Chaetodon trifascialis Quoy and Gaimand (Fig. 26).

The ground colour is a silver grey shading off to silver on the belly, and this is crossed by a number of dark narrow bands forming a series of Vs all directed forward. The breast is pale yellow deepening to olive on the snout. There is a broad black eye-stripe faced on both sides with a white stripe. The soft dorsal terminates in a point and is of an olive colour with a thin marginal black band and orange tips. The anal is also yellow with a marginal black band and white tip to the fin. The ventral is a bright orange whilst the tail has a thin black stripe on a bright yellow ground.

The distribution of this fish is the Red Sea, the East Coast of Africa and all over the Indo-Pacific, and it can be readily recognised by the black V-shaped marks on the body all pointing forward.

Off our coast it is not, in the experience of the author, a common fish and may be seasonable.

Genus *Heniochus*.

A small genus of Butterfly fishes which can be easily recognised by their thin and elevated bodies and by the front

of the dorsal fin being extended into a long streamer. Practically all have broad crossbands on the body. Their habits are the same as those of the other Butterfly fishes. Only one has been collected, so far, off our coastline.

Heniochus acuminatus Linnaeus (Fig. 27).

This is the common member of the genus. The body colour is an ivory white. There is a long streamer to the dorsal fin the front edge of which is orange. There are two black cross bands on the body; the front one extending across the body just behind the eye and along the forepart of the dorsal fin. The other is right across the body from the middle of the dorsal to the hind part of the anal fin. The soft dorsal, tail and pectoral fins are a rich lemon colour. The eye is a bright orange colour. It grows to a length of six inches and is eaten by the natives.

This fish is common in the Red Sea, the whole of the East African Coastline down to Natal, Zanzibar, Seychelles, and all over the Indian Ocean and the South Pacific.

Genus *Zanclus*.

Zanclus canescans Linnaeus. The Moorish Idol (Fig. 28).

This peculiar looking, but very handsome fish, is well-known, for its shape and colour have been used extensively for commercial design and as a cover illustration for advertising matter.

The general body colour is a bright canary yellow. The broad band of colour across part of the head and the forepart of the body, the hind stripe and the main colour of the tail all are rich chocolate brown. There is a chocolate, edged blue, wavy line on the snout and two wavy bright blue lines, run down the forward patch of chocolate brown. The hinder chocolate coloured patch also has a bright blue line on it. The tail fin is edged with bright yellow backed by a bright blue line. The pectoral fin is pale yellow and the ventral is black-chocolate in colour. There is a small horn just over the eye. This fish is hardly ever over four inches in length and it flits about the coral heads in a most absurd and grotesque manner.

The wide distribution covers the whole of the Indian and the South Pacific Oceans. It has been collected at Mombasa, Tiwi, and Zanzibar. The native name at Mombasa is *tantange*.

The Unicorn Fishes. Genus *Naso*.

This is a group of medium-sized to large herbivorous fishes found all over the Red Sea, Indian Ocean, and the Pacific. Some have a well-developed horn on the nose, but in others of the genus it is simply a slight bump. This horn imparts an extraordinary grotesque appearance to the fish. Generally they are dull-coloured, but some are vividly decorated whilst others are actually very beautiful. On either side of the caudal peduncle

there are a number of spines and these are first rate weapons of offence. Even a slight blow from the tail of one of these fishes will cut one's hand to the bone and that is the reason the native fishermen always remove them as soon as possible. The large specimens are, contrary to popular ideas, most excellent eating, but the skin should be removed either before or after cooking. In life the skin is rough to the touch, like that of a shark.

Naso brevirostris (Valenciennes) (Fig. 29).

When alive the colour of the body is a rich olive brown shading to white on the belly. The sides have a number of blue dots or lines and these are continued on the side of the head. There is an orange line on the gills. The dorsal, anal and pectoral fins are a uniform brown whilst the dorsal and anal often have a basal band of bright cobalt colour. The tail is a rich verdant green with a cross bar of yellow and one again of black and a pure white edging to the tip of the fin. On death all these colours vanish leaving a dirty uniform black colour all over the body.

This fish is common in the Red Sea, at Malindi, Kilifi, Mombasa, Gazi Bay, and Zanzibar, whilst it is found all over the Indian Ocean and the tropical Pacific regions. The native name is *poodju pemba*.

Naso tuberosus Lacépède (Fig. 30).

This fish can be immediately recognised from the previous one as the frontal horn is replaced by a rounded and most prominent bump. The older the specimen, the more prominent is this rounded bump.

The general body colour is a greyish brown, getting darker with age. The body is peppered all over with small blue spots. The dorsal and anal fins are an orange colour with a pale blue and a dark blue stripe and white edging to the fin. The pectoral is brown with a white margin; the ventral fin is yellow and the tail grey also with a white edging.

This fish is the largest of the genus going to eight pounds in weight. It is common in the Red Sea, all the way down the East African Coastline, to Mozambique and again all over the Indian Ocean. It is excellent eating. The native name is *poodju gamier*.

The Surgeon Fishes. Genus *Acanthurus*.

The name surgeon or lancet fishes is derived from the sharp caudal spine an offensive weapon used by violent sideways strokes of the body. These fish go in shoals about submerged reefs in a moderate depth of water. Piers and jetties are also a great attraction. Contrary to public ideas, all are excellent eating.

Acanthurus triostegus Linnaeus. The Striped Surgeon Fish (Fig. 31). The native name is *togo*.

The general body colour is a greeny-yellow shading to ivory white on the belly and throat. There are six transverse black bands on the side and a thin black longitudinal line along the middle of the snout. The fins are a pale green, but the caudal has a narrow black margin.

This fish is found all over the Indo-Pacific and is common all down the East African Coast; specimens having been obtained at Malindi, Kilifi, Mombasa, and Gazi Bay. It grows to six or seven inches and is eaten by the native fishermen. Another native name is *kigumwgumu.*

Acanthurus gahm Rüppell (Fig. 32).

The general colour of this fish is a rich black brown with a black stripe on the shoulder. There is a narrow bright blue stripe on the dorsal and anal fins. The caudal fin has a bright blue margin and the fork of the caudal has a whitish zone. The tip of the pectoral fin is a bright orange. This fish is widely spread all over the Indo-Pacific and it is also a very common fish in the fish markets at Malindi, Mombasa, and Nairobi. The spine is always cut off before being sold to the public. This fish runs to two pounds in weight and is excellent eating. The native name at Mombasa is *kangadjia* or *kangaja.*

Acanthurus leucosternon Bennett (Fig. 33).

The general body colour is a rich chocolate or umber brown fading to a pale orange on the throat and on the belly. There is a white band on the chin and another on the cheek. The caudal, anal and dorsal fins are slate black, but the caudal has bright orange tips.

This fish is found all over the Indo-Pacific and all down our Coastline to Mozambique. It is common at all the fishing places off our coast and in the fish markets. A native name given to the writer was *kangadjia marembo.*

NEW EAST AFRICAN *CURCULIONIDAE.*

Part I.

By Sir Guy A. K. Marshall, K.C.M.G., F.R.S.

The weevil fauna of East Africa is clearly a very rich one, and it is doubtful whether we yet know much more than a tenth of the species that occur there. Those dealt with in this paper are mostly derived from a large collection submitted for identification by Dr. V. G. L. van Someren, and the Coryndon Memorial Museum, Nairobi, which has made it possible to attempt some elucidation of the numerous species that have hitherto been "lumped" into the genus *Systates*.

The types of the new species have been deposited in the British Museum.

Subfamily *BRACHYDERINAE.*

Heterostylus gedyei, sp.n.

♂♀. Derm black, with dense pearl-grey or brownish grey scaling; elytra with a deeply zigzagged common V-shaped pale brown band across the top of the declivity, reaching laterally to stria 9, and before middle an indefinite small transverse patch of the same colour between striae 3 and 6. The ♂ is nearly always darker than the ♀.

Head elongate, the temples longer than an eye, with the usual shallow transverse impression between the frons and vertex; frons gently convex transversely, not elevated near the eyes, with a deep median stria, the coarse punctation hidden by scaling; eyes strongly convex, almost semicircular. *Rostrum* of ♀ about as long as broad, longer in ♂, gradually widening from base to genae, with dense broad epistomal setae; dorsal area slightly convex transversely with only an abbreviated low median carina partly covered by the scaling, which entirely conceals the coarse punctation so that the surface appears to be quite smooth; mandibles and mentum with dense setae and also a few scales. *Antennae* black, densely squamose; scape quite straight, gradually widening from base, extending shortly beyond the eyes, but not nearly reaching the prothorax; funicle with joint 2 longer than 1, 4-6 as long as broad, 3 and 7 slightly longer than broad. *Prothorax* slightly broader than long, widest at the base, with the sides almost straight and slightly converging from base to beyond middle, then narrowing with a curve to the apex,

which is not constricted; dorsum transversely convex, densely squamose, with a smooth even surface and a shallow abbreviated median stria which is often concealed by scaling. *Scutellum* sloping rather steeply forwards, squamose. *Elytra* widest at the obtusely prominent shoulders, gradually narrowing behind, slightly dehiscent at the apex; the narrow striae with widely separated shallow punctures, partly covered by scaling; the broad intervals feebly convex, with irregular appressed stout brown setae, which are short and inconspicuous on the disk and much longer on the declivity, where the suture is somewhat raised; the darker scales on intervals 1 and 2 from the middle to the declivity are mostly much narrower than the pale ones and sharply pointed. *Legs* with dense grey scaling, the femora with appressed broad setae; tibiae of ♂ with a sharp perpendicular mucro.

Length 8-12 mm., breadth 3.5-5.4 mm.

KENYA: Emali Range, Sultan Hamud, 4,900 to 5,900 feet, 28 ♂ 24 ♀, iii, 1940. (Emali Survey, Dr. V. G. L. van Someren.)

Allied to *H. longiceps* Pasc., from Tanganyika, which however is uniform brownish grey in colour, with the elytra much more strongly narrowed behind from the shoulders, the striae being broader and deeper and devoid of scaling; the sides of the dorsal area of the rostrum are more sharply marginate, and the median carina is higher and bare.

Subfamily *OTIORRHYNCHINAE*.

Diatmetus sparsisquamis, sp.n.

♂♀. Derm dull black, with sparse inconspicuous isolated scales above varying from metallic green to pale blue; underside with larger denser buff-coloured scales along the sides of the sternum.

Head with rugose confluent punctation and a short deep median sulcus; eyes moderately convex. *Rostrum* a little longer than broad, parallel-sided basally and only moderately dilated at the genae; the dorsal area shallowly sinuate laterally, rugosely and confluently punctate, with a rugose median carina and a depression on each side of it, the interantennal area containing a low subtriangular elevation behind the epistome. *Antennae* rather long, black; scape with sparse short pale setiform scales and stout recumbent dark setae; funicle with joint 1 a little longer than 2, 3 longer than 4, 4-7 subequal, much longer than broad, clavate. *Prothorax* transverse (8:11), gently rounded laterally, widest behind middle; dorsum somewhat flattened on the disk, rugulose with fairly close low granules and a broad shallow depression in the middle of the base. *Elytra* of ♂ broadly ovate, dilated at one-fifth from the base, the apices

jointly forming an obtuse angle; ♀ less dilated near the base, with a small obtuse laterally-projecting tubercle on each side at a short distance before the apex, the apices jointly projecting to form an acute angle; the dorsal outline almost flat in the basal third, then forming a moderately steep curve to the apex; the 16 fairly regular shallow striae containing small punctures separated by low round granules, those in the basal third of stria 1 being larger than the others; the intervals not wider than the punctures, rugulose, with a row of minute inconspicuous setae. *Legs* red, the tarsi and the apices of femora and tibiae black, with sparse pale setae; hind tibiae of ♂ strongly denticulate, several of the teeth being much larger than the others, hind tibiae of ♀ with only small granules. *Mesosternum* not tuberculate. *Venter* of ♂ with a very broad deep sulcus on the basal half of the anal ventrite and a transverse impression at its apex.

Length 8.5-10.5 mm., breadth 4-6 mm.

Kenya: Wandanyi, 5,000 feet; 8 ♂ 12 ♀, iii, 1939 (type); Teita Hills, Bura, 5,000 feet, 7 ♂ 4 ♀, ii, 1939 (Teita Hills Survey, V. G. L. van Someren); Teita Hills, near Voi, 4,500 feet, 1 ♂, on coffee, xi, 1921 (H. E. Box).

Of the two previously described species, the genotype, *praemorsus*, Gerst., differs in being densely clothed with brown scales; the eyes are more convex; the prothorax is rugose, but not granulate, narrowing from base to apex, with the sides straight; the base of the elytra is wider than that of the prothorax and the apices subtruncate; and the mesosternum is sharply tuberculate.

D. vicinus Hust., differs in having the antennae much shorter and stouter; the prothorax is sparsely granulate and parallel-sided in the basal half; and the mesosternum is tuberculate.

Polyrrhabdotus shimbanus, sp.n.

♂♀. Derm piceous to black; rostrum, head and prothorax with dense pale fawn scaling, which is usually more sparse in the middle of the latter causing an indefinite darker stripe, and some bright green scales at the apex of the rostrum and behind the eyes; elytra with rather sparse creamy or very pale green scales in all the punctures or depressions, here and there forming dense spots, especially in two very variable macular bands, one before the middle and the other at the top of the declivity.

Head with the forehead flat, densely squamose, with small bare spots bearing short stout suberect setae, and with a deep median sulcus; eyes very convex, highest behind the middle. *Rostrum* a little longer than broad, almost parallel-sided in the basal half, moderately dilated at the genae, the narrowest part between the scrobes about half the width of the base; the dorsal

area with a partly squamose median carina and a shallow longitudinal impression on each side of it, the subcarinate margins diverging behind; clothing as on the head; scape thick, feebly bisinuate; the two basal joints of the funicle equal. *Prothorax* transverse (3:4), rounded laterally, widest at a little behind the middle, with the apical margin sinuate; dorsum somewhat flattened in the middle of the disk, with dense scaling and scattered round opaque black spots bearing a short recumbent scale-like seta, without any median carina. *Elytra* subglobose (6:5), widest before the middle, acuminate at the apex, the humeral area obtusely elevated in ♀ only; dorsum very strongly convex longitudinally, highest before the middle, sloping steeply to the base, the curvature forming a strong angle with the outline of the pronotum; the large punctures very irregular, obscuring the normal striae and intervals, the septa between the punctures often uniting laterally to form undulant transverse ridges; the scaling mainly confined to the punctures. *Legs* red-brown, with rather dense pale scaling, the apices of the femora blackish with green scaling; hind tibiae of ♂ with a row of large blunt teeth, those of ♀ with only very small denticles. *Venter* of ♀ without any longitudinal sulcus at the base of ventrite 5.

Length 5.5-9.0 mm., breadth 3-5 mm.

KENYA: Rabai, 1 ♂ 1 ♀, i-ii, 1929 (*A. F. J. Gedye*); Rabai, 2 ♀, i, 1924, viii, 1937; Shimba Hills, 4 ♂ 4 ♀, iii, 1941 (*Dr. V. G. L. van Someren*).

The only other known species of the genus, *P. transversalis* Fst., 1896, has the scales of the elytra of a brilliant metallic green and these are confined to the depressions, forming narrow wavy transverse lines without any denser patches; the outline of the elytra is much less convex longitudinally and almost continuous with that of the pronotum; the granules on the pronotum are much larger and shiny; and ventrite 5 of the ♀ has a longitudinal impression in the middle of its base.

Genus *Systates* Gerst.

As at present constituted, *Systates* is obviously a composite genus, and authors have found difficulty in discriminating it from *Isaniris* Thoms. at one end of the series and *Nematocerus* Reiche (=*Tanycerus* Lac.) and *Mitophorus* Gerst., at the other end. Faust concluded (*Ann. Soc. Ent. Belg.*, 1894, p. 516, note) that the only character differentiating *Systates* from *Isaniris* was that the former had only ten regular striae, whereas the latter had twelve or more irregular ones; but this character occurs also in species that cannot be included in *Isaniris*.

A useful means for making a preliminary division of the complex is to be found in the number of setae on the disk of the

mentum, and twelve genera are distinguished in the following Key. These setae are sometimes difficult to see, but become much more conspicuous if the apex of the rostrum is turned away from the light; if they are abraded, the points of attachment can often be detected. The mouth-parts nearly always require to be cleaned first with benzine.

It is not to be assumed, however, that the species thus left in *Systates* necessarily form a homogenous assemblage; but the impossibility of obtaining access to a large number of the many described species renders any fuller analysis of the genus undesirable at present.

No genotype appears to have been fixed for *Systates* so far, and therefore the first and most widely spread species described by Gerstaecker, namely, *S. pollinosus,* is now cited as the genotype.

Key to Genera Allied to *Systates*.

1 (12). Mentum bearing only two setae on the disk.

2 (9). Elytra with only ten regular striae.

3 (4). Elytra sloping gradually down to their junction with the mesonotum, without any vertical declivity at base; scutellar area of mesonotum quite flat. .... **Mesoleurus,** g.n.

4 (3). Elytra with a more or less abrupt vertical declivity at the base which fits against the base of the prothorax; the posterior angle of the scutellar area turned abruptly upwards at its tip between the bases of the elytra.

5 (8). Elytra not carinate at base; joint 1 of funicle longer than 2; tibiae without a mucro; granules or punctures on pronotum transverse and often confluent.

6 (7). Rostrum without a median carina (except *sphaericus* Fst.); head separated from rostrum by a deep, strongly angulated sulcus, which unites in the middle with a short deep longitudinal furrow on the frons; the transversely striate occipital area extending right up to hind margin of eyes. .... **Phoromitus,** g.n

7 (6). Rostrum with a median carina; head separated from rostrum by a straight shallow sulcus, usually obsolete in middle; striolate occipital area not reaching eyes. .... *Nematocerus* Reiche.

8 (5). Elytra with a distinct basal carina; joint 1 of funicle not longer than 2; at least front tibia with a mucro;

granules or punctures on pronotum more or less round, not transverse. .... **Systaniris,** g.n.

9 (2). Elytra with twelve or more striae, usually very irregular without a basal carina.

10 (11). Corbels of hind tibiae open; joint 1 of funicle longer than 2; scrobes subdorsal, broadly visible from above; hind margin of epistome distinctly carinate, almost semicircular. .... **Isanates,** g.n.

11 (10). Corbels of hind tibiae very broadly enclosed; joint 1 of funicle a little shorter than 2; scrobes sublateral, only narrowly visible from above; hind margin of epistome obsolete. .... **Machaerorrhinus,** g.n.

12 (1). Mentum bearing more than two setae.

13 (22). Mentum bearing four or six setae.

14 (21). Intercoxal process of venter broadly truncate, as wide as or wider than a hind coxa; mentum with four setae.

15 (16). Corbels of hind tibiae narrowly enclosed; rostrum with the scrobes forming a deep, almost semicircular, lateral incision in the dorsal area, the posterior side of the incision forming a sharp angle; joint 1 of funicle equal to or shorter than 2; elytra with more than ten irregular rows of punctures. .... *Isaniris* Thoms.

16 (15). Corbels of hind tibiae entirely open; rostrum with the dorsal area not laterally incised; joint 1 of funicle always longer than 2.

17 (20). Rostrum with a median carina, epistome defined; hind tibiae without any mucro; vertex of head with strong transverse striation (often concealed by prothorax).

18 (19). Elytra with eighteen partly irregular rows of punctures. .... *Diaecoderus* Fairm.

19 (18). Elytra with ten regular striae. .... *Systates* Gerst.

20 (17). Rostrum without any median carina, epistome obliterated; hind tibiae with a mucro; vertex of head without transverse striation, even under prothorax; elytra with the punctures in the ten striae irregular and sometimes duplicated. .... *Liosystates* Hust.

21 (14). Intercoxal process of venter only half the width of a hind coxa; mentum with six setae; vertex of head without transverse striation; hind tibiae mucronate. .... *Oreosystates* Mshl.

22 (13). Mentum with eight setae. .... *Mitophorus* Gerst.

Seeing that as a result of this revision sixty of the species listed under *Systates* in the latest catalogue have to be transferred elsewhere, it will clearly be a convenience to list them here under their respective genera.

Diaecoderus Fairm.
- *acuticollis* Fst.
- *chyuluanus* Mshl.
- *densepunctatus* Aur.
- *otiorrhynchoides* Hust.
- *sobrinus* Mshl.
- *trapezicollis* Fst.
- *villosus* Hust.

Isanates, g.n.
- *bispinosus* Hust.
- *irregularis* Fst.

Machaerorrhinus, g.n.
- *bicornutus* Hust.

Mesoleurus, g.n.
- *albidovittatus* Fairm.
- *dentipes* Mshl.
- *habenatus* Mshl.
- *katonaensis* Hust.
- *strophosomoides* Hust.
- *suturalis* Hust.

Nematocerus Reiche.
- *angustirostris* Aur.
- *assimilis* Aur.
- *bayeri* Hust.
- *brevicornis* Hust.
- *castaneipennis* Hust.
- *dollei* Fairm.
- *elegantulus* Hust.
- *elongatus* Aur.
- *farinosus* Hust.
- *glaber* Hust.
- *laevistriatus* Hust.
- *lindblomi* Aur.
- *loveni* Aur.

Nematocerus Reiche—contd.
- *marginalis* Hust.
- *metallicus* Gerst.
- *mülleri* Hust.
- *nigriclava* Hust.
- *nigrinus* Hust.
- *nitens* Hust.
- *opacus* Aur.
- *pilifrons* Hust.
- *prolixus* Fairm.
- *proximus* Hust.
- *pyriformis* Aur.
- *rothschildi* Aur.
- *ruficornis* Fairm.
- *simplex* Aur.
- *striolatus* Aur.
- *sulcatus* Hust.
- *sylvaticus* Hust.
- *torticornis* Mshl.
- *virescens* Aur.
- *vittatus* Aur.
- *zukwalanus* Hust.

Phoromitus, g.n.
- *longehirtus* Hust.
- *rhinorhytus* Aur.
- *sphaericus* Fst.

Systaniris, g.n.
- *angulipennis* Qued.
- *erinaceus* Hust.
- *fossulatus* Klb.
- *laticollis* Pasc.
- *maynei* Mshl.
- *pumilus* Fst.
- *ramosus* Mshl.

Systates cobaltinus, sp.n.

♂♀. Derm rather dull black, with sparse narrow small scales of cobalt blue above, those on the head and pronotum being longer and setiform; one of the two females has the elytra with very few blue scales and with sparse spots of longer yellowish scales; underside with dense pale green scales at the sides of the sternum, the venter and metasternum with grey setae.

Head with very sparse recumbent blue setae and a few erect whitish ones; frons flat, lower than base of rostrum, as wide as the length of an eye, shallowly wrinkled, with a deep median

stria; eyes moderately convex. *Rostrum* a little longer than its basal width, scarcely narrowed from base to middle, slightly dilated at apex; the dorsal area almost parallel-sided, obtusely marginate laterally, with a strong median carina and an ill-defined low transverse elevation behind the epistome. *Antennae* long, very slender, piceous; scape abruptly clavate, with sparse recumbent setae; funicle with joint 1 as long as 2+3+4, 2-6 gradually diminishing, 7 as long as 4. *Prothorax* transverse (5:7), rounded laterally, widest at middle, slightly narrower at apex than at base; dorsum slightly convex longitudinally, highest near base, rather closely set with flattened granules of varying shapes, usually with a trace of a low median carina anteriorly. *Elytra* narrowly subelliptical in ♂, much broader in ♀, immarginate and vertically declivous at base; dorsal curvature slight in ♂ and vertical at apex, more convex in ♀ and incurved but not produced downwards at apex; the regular striae with deep punctures separated by low granules, the intervals transversely rugose, broader than the striae in ♀ but not in ♂, without setae. *Legs* black, with sparse recumbent bluish setae, the ♂ with the tibiae and the basal half of the femora beneath clothed with long white erect setae; front tibiae of ♂ not incurved at apex, hind tibiae deeply excavate and flattened on the apical half of the lower edge, the basal half of the inner edge strongly denticulate. *Venter* of ♂ rather thinly clothed with long soft erect white setae, the basal ventrite broadly and deeply depressed in the middle.

Length 4.8-6.5. mm., breadth 1.7-3.0 mm.

KENYA: Wandanyi, 5,000 feet, 16 ♂ 2 ♀, iii, 1939. (Teita Hills Survey, Dr. V. G. L. van Someren.)

Allied to *S. smeei* Mshl., from Nyasaland, which however, apart from colour distinctions, differs in having much stouter antennae, the frons level with the rostrum, less convex eyes, and coarsely granulate elytra.

Systates alsus, s.p.

♂♀. Derm shiny black with rather thin grey scaling above and below; elytra with intervals 1-3 more or less bare from base to top of declivity.

Head aciculate or with very shallow confluent punctures, sparsely squamose and with a few erect pale setae; frons flat, forming a low angle with the base of the rostrum, wider than the length of an eye (3:2), with a deep median stria; eyes moderately convex. *Rostrum* a little longer than its basal width, parallel-sided, not dilated at the genae; the dorsal area parallel-sided, tricarinate, the interantennal area impressed, almost smooth. Antennae long, very slender, honey-brown, with the club of the scape and the apices of the funicular joints infuscate; scape abruptly clavate, with sparse recumbent setae; funicle with joint 1 longer than 2+3, 2-6 gradually diminishing, 7 as long

as 4. *Prothorax* slightly transverse (9:10), rounded laterally, widest behind middle, shallowly constricted at apex, which is slightly narrower than the base; dorsum feebly convex longitudinally, highest near base and there steeply declivous, with close flattened granules and an ill-defined abbreviated smooth median line, and with slightly spatulate short suberect setae. *Elytra* narrowly ovate in ♂, much broader in ♀, immarginate and steeply declivous at base, produced downwards at apex in ♀; dorsal curvature slight in ♂ and very steep at apex, more convex in ♀ and vertical at apex; the regular striae with close deep round punctures, the intervals broader than the striae, smooth, with a row of broad setae, which are short, darker and inconspicuous anteriorly but pure white and erect on the declivity; in ♂ the posterior setae are short and rather sparse, in ♀ much longer and much more numerous, there being also a group of long narrower dark setae on interval 1 at the top of the declivity. *Legs* black, with sparse narrow grey scales; front tibiae of ♂ strongly incurved at the apex, the deep sinuation thus caused on the lower edge being denticulate and bearing long pale erect setae, hind tibiae similarly but less strongly curved, the inner face somewhat flattened and with a row of denticles along its upper and lower edges, those on the basal half being longer, especially on the lower edge; tibiae of ♀ much more shallowly sinuate, and only the hind pair finely denticulate. *Venter* of ♂ with very short sparse subrecumbent setae, ventrite 1 with a broad median sulcus and a strong costa on each side, 2 smooth in the middle and rugose laterally.

Length 4.5-6.0 mm., breadth 1.8-3.0 mm.

KENYA: Wandanyi, 5,000 feet, 5 ♂ 4 ♀, iii, 1939. (Teita Hills Survey, Dr. V. G. L. van Someren.)

Allied to *S. beiranus* Mshl., which has the rostrum somewhat dilated at apex, with the dorsal area sinuate laterally; antennae shorter and much stouter; prothorax more transverse, with larger convex granules; elytra submarginate at base, with much larger punctures; and the tarsi much shorter.

Systates oreas, sp.n.

♂♀. Derm dull piceous, with thin grey or yellowish scaling above and at the sides of the lower surface, and usually a faint common V-shaped pale mark at the top of the declivity.

Head finely rugulose, sparsely squamose, with a few short erect setae along the eyes; frons flat, forming a low angle with the base of the rostrum, much wider than the length of an eye (5:3), with a short deep median stria; eyes strongly convex. *Rostrum* as long as broad, almost parallel-sided, only very slightly dilated at the genae; the dorsal area flat or shallowly depressed, with a distinct median carina and a low obtuse transverse ridge anteriorly, the lateral carinae converging behind, the interantennal area depressed, bare and smooth. *Antennae* long,

slender, honey-brown; scape abruptly clavate, with sparse fine subrecumbent setae; funicle with joint 1 shorter than 2+3, 2-7 gradually diminishing. *Prothorax* transverse (♂ 5:6, ♀ 4.5:6), gently rounded laterally and widest at about middle in ♂, more strongly rounded and widest behind middle in ♀, broadly but shallowly constricted at apex, which is a little narrower than the base; dorsum feebly convex longitudinally, highest behind middle and moderately declivous at base, with fairly close small low granules, a variable smooth median line on the anterior half, a very shallow transverse depression on each side near apex, and a shallow round impression on each side near base; the setae short, spatulate and recumbent. *Elytra* narrowly elliptical in ♂, broadly ovate in ♀, vertically declivous and immarginate at base in both sexes, and produced downwards at apex in ♀; dorsum flattened on the disk and steeply declivous behind, with a deep oval depression before middle in ♀ between intervals 1 and 3 (very feeble or obsolete in ♂); the regular striae with small close punctures, the intervals broader than the striae, especially in ♀, each with a row of erect spatulate setae, which are sparse and inconspicuous on the disk and longer and denser on the declivity, there being a conspicuous tuft of setae on interval 1 at the top of the declivity in ♀. *Legs* with sparse pale scales and an indefinite pale band on the femora: front tibia of ♂ strongly incurved at apex and finely denticulate below, those of ♀ less curved and not denticulate; hind tibiae similar in the two sexes, slightly curved, flattened on the inner face, of which both upper and lower edges are finely denticulate. *Venter* of ♂ broadly but shallowly impressed at base, with a shallow median furrow on the posterior half of ventrite 1.

Length 4.5-5.5 mm., breadth 2-4 mm.

KENYA: Mt. Kenya, 8,000 feet, 3 ♂ 6 ♀, xii, 1934 (A.F.J. Gedye type); Gura River, 7,500 feet, 3 ♂ 1 ♀, viii, 1929 (R. E. Dent); Nanyuki, 5,500 feet, 3 ♀, xii, 1926 (A. F. J. Gedye); S.E. slopes of Mt. Kenya, 6,000 to 7,000 feet, 1 ♀, ii, 1911, W. slopes of Mt. Kenya, on Meru-Nyeri road, 6,000 to 8,500 feet, 1 ♂ 1 ♀, ii, 1911 (Dr. S. A. Neave).

Closely allied to *S. cordatus* Aur., which, however, has the eyes less convex; the rostrum has no transverse ridge anteriorly and the interantennal area is not depressed; the elytra of the ♀ are much narrower, not flattened dorsally, and without the two discal impressions.

Genus *Diaecoderus* Fairm.

This genus does not appear to have been recognised by recent authors. Two specimens of the genotype, *D. hamaticollis* Fairm., taken by Revoil at Tabora, Tanganyika, were in the Fry Collection (British Museum) and prove to be closely allied to *Systates acuticollis* Fst., from the same country, so that this species

together with five other *Systates* (indicated above) must be transferred to this genus. *Isaniris ater* Mshl., also belongs here, as well as *I. cognatus* Mshl.

The genus, as at present known, ranges from Abyssinia, through Kenya, Tanganyika, Nyasaland and the Rhodesias into the Katanga district of the Belgian Congo.

Genus **Mesoleurus,** nov.

The species of this genus differ from all the others here associated with them in the form of the mesonotum and the base of the elytra. In the other genera there is at the base of the elytra a short vertical declivity (the upper edge of which may or may not be carinate) that fits more or less closely against a similar area at the base of the pronotum, thus normally concealing the mesonotum. But in *Mesoleurus* the elytra slope more or less gradually down to the mesonotum, which is seen as a large flat triangle between their bases, and the base of the prothorax slides freely over them, being itself almost flat without any basal carina. This mesonotal triangle is here called the scutellar area, because it is not a true scutellum in the conventional sense of that term.

In the winged *Curculionidae* the posterior angle of the scutellar area is first turned upwards and its tip is again bent backwards between the bases of the elytra on the dorsal surface, this tip forming the normal scutellum. In most wingless forms the tip of the scutellar area still turns almost vertically upwards, but is not bent backwards between the elytra and is not normally visible dorsally. In *Mesoleurus,* however, the scutellar area is flat throughout to the tip of the angle, and is usually broadly exposed, being even squamose in some species.

Other characters are: *Rostrum* separated from the frons by an almost straight incision; mentum somewhat immersed at base, with only two setae. *Antennae* slender, scape cylindrical, with finely appressed setae, joint 1 of funicle longer than 2, all joints longer than broad. *Elytra* gradually narrowing to base, with ten regular striae. *Legs* with the front coxae very close to the anterior margin of the prosternum; corbels of hind tibiae open.

Genotype: *Systates habenatus* Mshl.

Five other species of *Systates* that must also be transferred to this genus have been listed above (p. 314), and seven new species are described below.

The genus ranges from Eritrea down to the Rhodesias and into the Katanga district of the Belgian Congo, but it has not been found in Uganda or further west.

Key to the Species of *Mesoleurus*.

1 (10). Frons very broad, its width twice the length of an eye or nearly so; lateral margins of dorsal area of rostrum

rather ill-defined; scutellar area squamose; epistome without a carinate margin.

2 (9). Pronotum with shallow subreticulate or confluent punctures; dorsal area of rostrum much narrower than frons; mid coxae and hind tibia of ♂ without processes.

3 (6). Elytra without any definite sublateral stripe; funicle with joint 3 only slightly longer than 4.

4 (5). Scaling pale green, dorsal scales almost round; elytra of ♀ with the dorsal outline sloping upwards from base; hind tibiae of ♂ narrower, the inner face flattened only near apex, partly squamose and without transverse ridges .... *strophosomoides* Hust.

5 (4). Scaling pale coppery, dorsal scales narrow; elytra of ♀ flat at base forming an almost continuous line with the pronotum; hind tibiae of ♂ with the inner face broadly flattened throughout, bare, with numerous transverse ridges. .... **costatipes**, sp.n.

6 (3). Elytra with a sublateral stripe of scales; funicle with joint 3 very nearly as long as 4+5.

7 (8). Elytra with a sharply defined sublateral stripe of pale green or gold scales between striae 5 and 8, interval 3 without any row of spots; base of venter and metasternum depressed in ♀, the latter with numerous scales and sparse recumbent setae. .... **limbatus**, sp.n.

8 (7). Elytra with a whitish sublateral stripe that is irregular on both edges and a row of small whitish spots on interval 3; base of venter and metasternum not depressed in ♀, the latter with numerous suberect setae and sparse narrow scales. .... **direptus**, sp.n.

9 (2). Pronotum with flat granules; dorsal area of rostrum nearly as wide at base as the frons; mid coxae of ♂ with a long stout spine, hind tibiae of ♂ with a broad laminate process near apex on inner edge
.... **laminifer**, sp.n.

10 (1). Width of frons not greater than the length of an eye, or rarely one-third more; lateral margins of dorsal area of rostrum sharply defined, scutellar area of mesonotum bare.

11 (12). Epistome without a carinate margin, rostrum parallel-sided; frons wider than dorsal area of rostrum; front tibiae of ♂ with a very large triangular tooth on inner edge and mid tibiae with a long sharp tooth
.... *dentipes* Mshl.

12 (11). Epistome with a carinate margin; frons not wider than base of dorsal area of rostrum; anterior pairs of tibiae of ♂ without a tooth.

13 (14). Rostrum with a distinct median carina, pronotum with duplicate punctation; elytra densely squamose throughout .... *albidovittatus* Fairm.

14 (13). Rostrum with the median carina absent or obsolescent; pronotum with simple punctation or flattened granules; elytra only partly squamose.

15 (18). Pronotum with granules only, without punctures; rostrum with a carina running obliquely backwards and downwards from the lower edge of the scrobe.

16 (17). Rostrum longer than broad; frons depressed, with a long median stria; pronotum shiny, with much flattened large subcontiguous granules; elytra ovate, without any patch of scales at base of intervals 6-9 or behind middle on interval 4 .... *habenatus* Mshl.

17 (16). Rostrum stouter, quadrate; frons longitudinally convex, with a round fovea equidistant from rostrum and eyes; pronotum dull, shagreened, with small separated granules; elytra pyriform, with a patch of scales at base of intervals 6-9 and another on 4 behind middle **cyladoides,** sp.n.

18 (15). Pronotum punctate or with mixed punctures and flattened granules; rostrum without an oblique carina below scrobe.

19 (20). Prothorax very nearly as wide at apex as at base, almost as long as broad; elytra subglobose, strongly constricted at base, without any sutural stripe of scales, but with an abbreviated stripe on interval 4 starting behind base and not reaching middle ... **plagiatus,** sp.n.

20 (19). Prothorax much narrower at apex than at base, distinctly transverse (3:4); elytra pyriform or ovate, moderately constricted at base, with a complete sutural stripe but none on interval 4.

21 (22). Pronotum with mixed punctures and flattened granules; funicle with joint 7 much longer than broad; the postmedian patches of scales on intervals 5 and 6 of elytra short oblong, almost in juxtaposition, extending only shortly behind the stripe on interval 7 .... *katonaensis* Hust.

22 (21). Pronotum simply punctate; funicle with joint 7 as long as broad; the postmedian patches on intervals 5 and 6 elongate, extending in echelon far behind the stripe on interval 7 .... **cinctus,** sp.n.

Judging by the description, *Systates suturalis* Hust., 1931, is provisionally transferred to this genus; it is apparently allied to the last two species, but the sublateral stripe is broader (on intervals 6-8) and curves inwards behind to interval 3; and joints 1 and 2 of the funicle are equal.

Mesoleurus limbatus, sp.n.

♀. Derm dull black, with separated narrow pale green or coppery scales that do not conceal the integument; prothorax with a broad lateral stripe of denser broader pale green or coppery

scales; elytra with a sharply defined lateral stripe of broader pale green or pale gold scales between striae 5 and 8 from base nearly to apex, or suffusing the whole apical area.

Head with small dense confluent punctures but only the narrow intervals showing through the scaling; frons very broad, nearly as broad as the base of the rostrum, the width equal to twice the length of an eye, with a deep median fovea adjoining the rostrum; eyes strongly convex. *Rostrum* slightly broader than long, narrowing from base to apex, the genae not projecting; the dorsal area nearly half the width of the frons, transversely depressed in the middle, with a distinct median carina, but the lateral carinae becoming obsolescent behind, the interantennal part separated off by a transverse ridge, flat and less rugosely punctate than the posterior part; epistome with an obtuse non-carinate margin. *Antennae* elongate, very slender, testaceous, with the apex of all the joints infuscate; scape abruptly clavate, with sparse appressed fine setae; funicle with all the joints clavate, 1 shorter than 2+3, 3 much longer than 4, 4-6 equal, 7 nearly as long as 3. *Prothorax* transverse (10:13), parallel-sided from base to middle, then narrowing slightly to apex; dorsum punctate like the head, with an indefinite shallow transverse impression close to apex. *Scutellar area* densely squamose. *Elytra* of ♀ subelliptical, moderately rounded laterally, widest at a little behind middle; dorsal outline gradually rising from base, then nearly flat to the declivity, which is vertical; the shallow striae with small close deep punctures which become very shallow behind, the intervals broad, slightly convex and finely rugulose transversely; the numerous irregular setae short, clavate and subrecumbent on the sides and declivity, but much smaller and inconspicuous on the disk. *Legs* black, rather densely squamose, the tarsi reddish; hind tibiae of ♀ slightly curved and with small granules on the inner edge; hind tarsi with joint 1 longer than 2+3.

Length 6 mm., breadth 2.2 mm.

N.W. Rhodesia: Mwengwa, 2 ♀, xii, 1913, i, 1914 (H. C. Dollman).

Close to *strophosomoides* Hust., from Katanga, which differs (in addition to the characters given in the Key) in having the sides of the prothorax more rounded, and the pale green scales on the disk of the elytra are almost round, instead of narrow.

Mesoleurus direptus, sp.n.

♀. Derm dull black, with narrow greyish or coppery scales that do not conceal the surface and markings formed of denser broader whitish scales; prothorax with a much interrupted broad whitish lateral stripe and a few white scales down the median line; elytra with a very irregular submarginal whitish stripe and interval 3 with a row of small white spots varying in

number from 2 to 7; underside with rather dense suberect setae and sparse narrow scales, without the usual densely squamose areas laterally.

Closely allied structurally to *limbatus*, sp.n., and differing chiefly as follows:—

Head much more coarsely punctate, with the elongate frontal fovea rather broader and deeper; the only pale markings being a small spot in front of the eyes and a few scales along the median line. *Rostrum* somewhat broader and less narrowed in front. *Prothorax* proportionately longer, more strongly punctate, more or less striolate transversely, the spaces between the punctures usually forming small low granules. *Scutellar area* with only a few scales. *Elytra* ovate, widest before the middle, the vertical posterior declivity longer and much more abrupt; the punctures in the striae larger and much less diminished behind. *Legs* black, except the red claws, with rather sparse narrow scales; legs rather stouter than in *limbatus*, hind tarsi with joint 1 not longer than 2+3.

Length 6.0-6.7 mm., breadth 2.5-2.7 mm.

TANGANYIKA: Ndala, Tabora district, 3 ♀, xii, 1916, i, 1917 (*Dr. G. D. Hale Carpenter*).

Mesoleurus costatipes, sp.n.

♂♀. Dull black, rather thinly clothed with narrow non-contiguous coppery scales; prothorax with a very indefinite lateral stripe of broader and usually paler scales, and similar scales scattered on the sides and posterior declivity of the elytra.

Head and *rostrum* of ♀ as described for *M. limbatus*, sp.n., except that the dorsal area of the rostrum is not depressed, the median carina is flattened, and the lateral carinae less distinct; rostrum of ♂ slightly longer and the width of the frons only 1.5 times the length of an eye. *Antennae* as in *M. limbatus*. *Prothorax* of ♂ somewhat transverse (5:6), moderately rounded laterally, widest at middle, distinctly narrower at apex than at base, with small rugosely-confluent punctures, a broad shallow transverse depression at the apex, and usually a small smooth spot in the middle of the disk; prothorax of ♀ broader and less rounded laterally. *Scutellar area* densely squamose. *Elytra* of ♂ rather narrowly subelliptical, widest at middle, the dorsal outline almost flat, continuous with that of the pronotum, or nearly so, the posterior declivity sloping, the shallow striae with small close punctures that scarcely diminish behind, the broad intervals slightly convex and finely rugulose, the irregular short subrecumbent setae inconspicuous except on the declivity; elytra of ♀ much broader, the dorsal outline continuous with that of the pronotum, the posterior declivity vertical, and the apex somewhat produced downwards. *Legs* black, rather sparsely squamose, the tarsi red-brown; hind tibiae of ♂ with the inner

face broadly flattened throughout, bare, with numerous transverse ridges, those of ♀ not flattened or granulate internally; hind tarsi with joint 1 not longer than 2-3. *Venter* of ♂ with a broad median furrow on ventrite 5.

Length 5-6 mm., breadth 2.0-2.6 mm.

N.E. RHODESIA: Serenje district, 3 ♂ 10 ♀, xii, 1907 (*Dr. S. A. Neave*).

Closely allied to *strophosomoides* Hust., but sufficiently distinguished by the characters given in the Key. In the original description of the latter species the rostrum is said to be longer than broad and the prothorax of the male as long as broad, whereas in the specimens before me (including a cotype) both these parts are broader than long.

Mesoleurus laminifer, sp.n.

♂. Rather dull black, with sparse small broad whitish scales, which are denser laterally on the prothorax, elytra and sternum.

Head rugosely punctate, sparsely squamose; frons nearly as broad as the base of the rostrum, the width 1.7 times the length of an eye, flat transversely, with a small median fovea adjoining the rostrum; eyes strongly convex. *Rostrum* as long as broad, almost parallel-sided; the dorsal area slightly convex transversely, widening from antennae to base, rugosely punctate, with a strong median carina, the lateral margins becoming indistinct basally, the interantennal part concave, smooth and sparsely punctate; epistome with the margin not carinate. *Antennae* elongate, slender, reddish or testaceous, with the apices of all the joints and the club infuscate; scape abruptly clavate, with fine sparse recumbent setae; funicle with the joints clavate, 1 shorter than 2+3, 3 much longer than 4, 4 slightly longer than 5, 5-7 subequal. *Prothorax* very nearly as long as broad, rounded laterally, widest at middle, a little narrower at apex than base, sometimes with a transverse impression near apex; dorsum transversely rugulose, with numerous small flat granules bearing a puncture on the inner side that often makes them appear lunate. *Scutellar area* sparsely squamose. *Elytra* of ♂ narrowly subelliptical, widest before middle; dorsal outline rising slightly from the base, then almost flat, the declivity steep; the shallow striae with strong punctures that only slightly diminish behind; the broader intervals somewhat convex, transversely rugulose, the very short recumbent setae inconspicuous even on the declivity. *Legs* entirely black, sparsely squamose; mid coxae bearing a very stout long blunt spine; front tibiae deeply sinuate on the inner edge close to apex, mid pair with a rather shallower sinuation and a few sharp granules above it, hind pair flattened and bare on the inner face with numerous transverse sulci and ridges, and just before the apex a large subtriangular laminate process projecting inwards and upwards which is clothed on its

distal surface with long curved setae, a few of which also ascend the dorsal edge of the tibia for a short distance; hind tarsi with joint 1 a little shorter than 2+3.

Length 7.0-8.5 mm., breadth 2.5-3.0 mm.

NYASALAND: Between Fort Mangoche and Chikala Boma, 4,000 feet, 2 ♂, (*Dr. S. A. Neave*).

The remarkable processes on the mid coxae and hind tibiae render the ♂ of this species easily recognisable.

Mesoleurus cyladoides, sp.n.

♀. Derm rather dull black; elytra bare except for the following markings formed of narrowly ovate whitish scales with a golden reflection: an ill-defined round spot at the base of intervals 6-9, an abbreviated stripe occupying about the middle half of interval 8, a postmedian macular band on 7 to 4 (the spots on 7 and 6 quadrate, that on 5 half as long and that on 4 twice as long as the one on 6), and a sparser stripe on the declivity on 2 and 3; underside with similar dense scaling at the sides of the meso- and metasternum, venter with sparse setiform scales.

Head opaque, shagreened, with obsolescent punctures and a few narrow scales; frons only as wide as the base of the dorsal area of the rostrum, longitudinally convex, with a deep median fovea about equidistant from the eyes and rostrum; eyes strongly convex. *Rostrum* stout, as broad as long, quite parallel-sided, the genae not projecting, the margin of the epistome carinate; dorsal area bare, shagreened, dull and impunctate on basal two-thirds, the interantennal part more shiny and rugulose, without any median carina, the lateral margins carinate and sinuate; lateral areas with a low obtuse carina running obliquely downwards from the scrobe. *Antennae* slender, piceous; scape gradually clavate; funicle with the joints elongate, 1 as long as 2+3, 3 much longer than 4, 4-7 subequal. *Prothorax* as long as broad, rather strongly rounded laterally, widest at middle, narrowed but not constricted at base and apex, the arcuate apex very nearly as wide as the base; dorsum dull, shagreened, with small separated low granules, bare on the disk, and with a very few sparse narrow scales laterally. *Scutellar area* bare. *Elytra* broadly pyriform, much narrowed at base, widest at one-third from apex; the dorsal outline strongly convex, highest behind middle, not vertical at apex; the very shallow striae with a row of small separated punctures, the intervals broad and finely aciculate. *Legs* with the femora piceous and with narrow scales dorsally, tibiae and tarsi red-brown; femora finely aciculate, with sparse minute granules dorsally; hind tarsi with joint 1 shorter than 2+3.

Length 5 mm., breadth 1.7 mm.

TANGANYIKA TERRITORY: Tabora, 1 ♀ (*G. Revoil*).

A very distinct species, the female having somewhat the facies of a small wingless *Cylas*.

Mesoleurus plagiatus, sp.n.

♀. Rather dull bronze-black, almost bare, except for markings of dense pale green scales; prothorax with a rather indefinite broad lateral stripe; elytra with an irregular sub-triangular basal patch between striae 5 and 8, close behind this a large oblong patch on intervals 7 and 8 (the part on 8 produced nearer to the base), adjoining this patch a small transverse spot on interval 6, and a stripe on 4 beginning not far from the base and ending before the middle, the apical area and part of the suture with sparse setiform coppery scales; underside with fairly numerous narrow coppery scales, becoming much denser and whiter on the mesepimera and sides of the metasternum.

Head shagreened, with shallow separated punctures and sparse setiform scales, frons only slightly wider than the dorsal area of the rostrum, almost flat, with a deep oval fovea remote from the rostrum; eyes moderately convex. *Rostrum* broad, almost parallel-sided, as long as broad, the margin of the epistome carinate; dorsal area nearly flat, bare, shagreened and almost impunctate on the basal half, shiny and confluently punctate in front, with a broad low elevation in middle of base, without a median carina, the lateral margins strongly carinate and sinuate; lateral areas without any oblique carina below the scrobe. *Antennae* slender, black, the club reddish; scape gradually clavate; funicle with joint 1 a little shorter than 2+3, 3 slightly longer than 4. *Prothorax* very nearly as long as broad, gently rounded laterally, widest at middle, narrowed but not constricted at base and apex, the latter only slightly the narrower; dorsum opaque, with small much flattened granules and some obsolescent punctures between them. *Scutellar area* bare. *Elytra* broadly ovate, widest at middle, deeply constricted at base, so that the basal area is below the level of the mesonotum; dorsal outline strongly convex, highest at middle, steeply declivous but not vertical behind; the shallow striae with small deep punctures that scarcely diminish behind, the broad intervals finely aciculate transversely. *Legs* black with the last two joints of the tarsi reddish, with sparse narrow scales which are denser on the dorsum of the posterior femora; joint 1 of hind tarsi shorter than 2+3.

Length 6 mm., breadth 2.7 mm.

TANGANYIKA TERRITORY: Ndala, Tabora district, 1 ♀, xii, 1916, i, 1917 (*Dr. G. D. Hale Carpenter*).

Mesoleurus cinctus, sp.n.

♂♀. Derm shiny bronze-black, mostly bare; prothorax with a broad lateral stripe of pale green or golden scales; elytra with the following markings formed of similar scales: a complete sutural stripe, a stripe on interval 7 from base to beyond middle, and an elongate patch on 6 and another one on 5 continuing beyond the stripe in echelon; the apical area generally with

sparser narrower scales, and some very sparse coppery setiform scales on each side of stria 8; underside with sparse narrow scales, and dense broader scales at the sides of the sternum.

Head with small separated punctures and sparse narrow green or coppery scales; frons flat, as wide as the base of the dorsal area of the rostrum, the width only slightly greater than the length of an eye, with a median sulcus; eyes moderately convex. *Rostrum* a little longer than broad in ♂, as long as broad in ♀, narrowing slightly from base to middle, then almost parallel-sided to apex, margin of epistome carinate; dorsal area broadly but shallowly depressed down the middle, with sparse, very shallow and often longitudinally confluent punctures and a few narrow scales, the median carina feeble or obsolete, the lateral margins strongly carinate and somewhat sinuate. *Antennae* comparatively short and stout, piceous; scape gradually clavate, with sparse fine recumbent setae; funicle with joint 1 somewhat longer than 2, 3 and 4 subequal and a little longer than broad, 5-7 equal and as long as broad. *Prothorax* transverse (3:4), gently rounded laterally, widest at or behind middle, not constricted at apex, which is narrower than the base; dorsum with fine punctures of varying density, usually separated but often transversely confluent, especially towards the base. *Elytra* of ♂ narrowly elliptical, widest at middle, the dorsal outline flat and continuous with that of pronotum, the declivity sloping; elytra of ♀ broader, widest at or before middle, the dorsal outline moderately convex, the declivity vertical near apex; the very shallow striae with deep small punctures which diminish behind, especially in ♀, the broad intervals very shiny, though sometimes shallowly aciculate, without setae. *Legs* with the femora black, the tibiae and tarsi reddish to piceous, with sparse narrow scales; hind tibiae straight, strongly serrate on the lower edge throughout in ♂, but only finely granulate on the apical half in ♀; hind tarsi with joint 1 as long as 2+3. *Venter* of ♂ with numerous small granules, especially on the basal half, these granules much sparser in ♀.

Length 5-6 mm., breadth 1.5-2.5 mm.

TANGANYIKA TERRITORY: Ngorongoro Crater, Serengeti Plains, 9 ♂ 9 ♀, iv, 1941.

Closely allied to *katonaensis* Hust., but in addition to the distinctions given in the Key, the elytra in the latter species are more pyriform and relatively more narrowed at the base.

Genus **Phoromitus,** nov.

Head separated from the rostrum by a deep, strongly angulated sulcus, which unites in the middle with a very short deep longitudinal furrow on the frons; when the head is fully withdrawn the eyes can touch the front margin of the prothorax, and the transverse occipital striation thus extends right up to

the eyes; frons as wide as the base of the dorsal area of the rostrum. *Rostrum* stout, as long as or longer than broad, not or but slightly dilated at the genae, without a median carina (except *sphaericus* Fst.); epistome short, its curved carinate basal margin sometimes rather indistinct; mentum rather small, immersed at the base, with only two discal setae. *Antennae* with the scape compressed or cylindrical; funicle with joint 1 longer than 2, distal joints longer than broad, clavate. *Prothorax* fitting closely to elytra, with the basal margin finely carinate. *Elytra* ovate in ♂, rotund and very convex in ♀, with ten rows of punctures or shallow striae and rows of erect setae (except *sphaericus*).

Genotype: *Mitophorus gravidus* Gerst.

The species included in this genus have been partly associated erroneously with *Mitophorus pruinosus* Gerst., from the Zambezi Valley, and partly placed in *Systates*. In addition to the genotype, the following species must be transferred here: *Mitophorus pilosus* Hust., *M. largus* Mshl., *Systates sphaericus* Fst., and *S. rhinorhytus* Aur.

S. longehirtus Hust., must also be included, as it is a synonym of *rhinorhytus* (cotypes compared) (*n.syn.*).

The species form a homogenous group, which can be distinguished from both *Mitophorus* and *Systates* by the structure of the head and the basally immersed mentum bearing only two setae.

Key to the Species of *Phoromitus* Mshl.

1 (14). Rostrum without any median carina; frons not interrupted in middle by base of rostrum; intervals on elytra without granules and with fine erect setae.

2 (11). Scape of antennae compressed (usually more so in ♀); front tibiae of ♂ with inner angle of corbel projecting forwards longitudinally in a sharp curved process.

3 (6). Elytra with a stripe or row of spots formed of scales on interval 3.

4 (5). Scales on elytra short, ovate and obtuse at apex; hind tibiae straight .... *gravidus* Gerst.

5 (4). Scales on elytra long, narrow and sharply acuminate; hind tibiae strongly curved in ♂, slightly so in ♀ .... *pilosus* Hust.

6 (3). Elytra setose only on disk, without scales.

7 (8). Elytra with interval 8 clothed with sparse pale setae like the others .... *rhinorhytus* Aur.

8 (7). Interval 8 with a dense stripe of pale bluish green elongate scales from base to beyond middle.

9 (10). Elytra subglobose, without any short recumbent setae on the dorsum .... **lucens,** sp. n.

10 (9). Elytra broadly ovate, with numerous short recumbent setae dorsally .... **sublateralis,** sp.n.

11 (2). Scape of antennae cylindrical; front tibiae of ♂ normal, truncate at apex.

12 (13). Elytra bronze, with very long erect setae (much longer than the width of an interval); scape with a small club, joint 2 of funicle longer than 3 .... *largus* Mshl.

13 (12). Elytra blue-black, with much shorter erect setae (shorter than the width of an interval); scape with very large club, joint 2 of funicle not longer than 3 .... **brevisetis,** sp.n.

14 (1). Rostrum with a distinct median carina, its median basal angle produced so far backwards as almost to divide the frons into two; intervals on elytra with a row of very small granules, each bearing a short subrecumbent spatulate seta .... *sphaericus* Fst.

Phoromitus lucens, sp.n.

♀. Derm bronze, very shiny; prothorax with sparse recumbent white setae, without scales; elytra dorsally with only the usual rows of long slender setae, without any recumbent setae and only a few narrow green scales on the basal slope, but interval 8 with a dense stripe of narrow greenish scales from base to two-thirds and passing over behind on to interval 7, and the area below this stripe rather thinly clothed with short recumbent metallic setae, and a few similar setae on the apical declivity.

Head impunctate or with very few shallow punctures, frons with sparse setae and a very deep median fovea; eyes rather strongly convex. *Rostrum* a little longer than broad, narrowing from base to scrobes and moderately dilated at the genae; dorsal area almost flat basally, shallowly concave in front, sparsely punctate or shallow striolate in middle, the lateral margins strongly carinate and sinuate. *Antennae* piceous, with sparse subrecumbent setae; scape compressed, abruptly clavate; funicle with joint 2 slightly longer than 3, 7 as long as 4. *Prothorax* a little broader than long, gently rounded laterally, widest slightly before the middle, of equal width at base and apex; dorsum quite smooth and sparsely punctate down the middle of the disk, becoming transversely rugose laterally and with a transverse impressed line on each side behind middle, with sparse fine recumbent and suberect setae. *Elytra* of ♀ subglobose, the dorsal outline rising rather steeply at the base but forming a low curve on the disk and becoming vertical towards apex; the shallow striae with deep round punctures that do not diminish behind, the intervals slightly convex, quite smooth and very shiny, with a row of long fine erect setae. *Legs* bronze, with sparse recumbent metallic setae; hind tibiae of ♀ slightly curved, with a few granules on the inner edge.

Length 4.5-5.5 mm., breadth 2.4-2.7 mm.

TANGANYIKA TERRITORY: Meru, Kingori, 2 ♀, vi, 1914.

Much resembling the female of *rhinorhytus* Aur., in general facies, but in that species the prothorax is longer than broad and rugosely sculptured throughout, and the elytra bear numerous short recumbent setae on the disk but have no sublateral stripe of scales.

Phoromitus sublateralis, sp.n.

♂ ♀. Derm dark blue, black or rarely bronze, shiny, sparsely clothed above with metallic recumbent setae and rows of very long erect setae on the elytra, which have on interval 8 a dense stripe of pale bluish-green elongate scales from base to beyond middle; underside clothed laterally with narrow or setiform, pale green scales.

Head with sparse shallow punctures on the frons and a very short deep median sulcus; eyes strongly convex. *Rostrum* as long as broad, gradually narrowing from base to middle and slightly widened at the genae; dorsal area concave with sparse shallow punctures, sometimes almost impunctate or rarely wrinkled longitudinally, the lateral margins rather strongly carinate. *Antennae* piceous, with sparse subrecumbent pale setae; scape distinctly compressed, only slightly wider in ♀, with a large abrupt club; funicle with joint 2 slightly longer than 3, 7 as long as 4. *Prothorax* nearly as long as broad, gently rounded laterally, widest at middle, of equal width at base and apex; sculpture of dorsum variable, normally transversely rugose, but sometimes smooth in the middle of the disk, with sparse small punctures. *Elytra* of ♂ narrowly ovate, widest at one-fourth from base, those of ♀ more broadly ovate (not globose), widest near middle; the dorsal curvature low in ♂, higher in ♀, but less convex than in most other species; the shallow striae with deep round punctures, the intervals wider than the striae, feebly convex, almost smooth, each with a sparse row of very long fine erect setae. *Legs* bronze-black, with sparse metallic recumbent setae and pale erect ones; front tibiae of ♂ with a sharp apical process projecting straight forwards, posterior pairs only slightly curved and with short obtuse teeth on the inner edge.

Length 5-6 mm., breadth 2.0-2.5 mm.

TANGANYIKA TERRITORY: Ngorongoro Crater, Serengeti Plains, 14 ♂ 3 ♀, iv, 1941.

Closely allied to *P. rhinorhytus* Aur., from Kilimanjaro, which, in addition to the absence of squamose stripes on the elytra, differs in having the dorsal area of the rostrum flat with the margins less carinate; the scape is rather more slender and joints 2 and 3 of the funicle are equal; the elytra are broader, especially in the ♀; and the apical process on the front tibiae of the ♂ is more oblique.

Phoromitus brevisetis, sp.n.

♂ ♀. Derm black, with the elytra blue-black, sparsely covered with small ovate or narrow, pale bluish-green scales, and with short erect white setae; underside with similar sparse scales at the sides of the sternum.

Head with the frons rather strongly wrinkled longitudinally, and with a short deep median sulcus; eyes moderately convex. *Rostrum* longer than broad (9:7), shallowly sinuate at the sides; dorsal area almost parallel-sided, rugosely wrinkled longitudinally, with a deep median sulcus; scape similar in the two sexes, cylindrical, abruptly and strongly clavate; funicle with joints 2 and 3 equal, 7 as long as 4. *Prothorax* a little longer than broad, almost parallel-sided, with a slight widening beyond middle, of equal width at base and apex; dorsum with transversely confluent flattened granules and short suberect white setae. *Elytra* broadly ovate and convex in ♂, globose and strongly convex in ♀; the comparatively broad and deep striae with strong punctures, the intervals broader than the striae, slightly convex, almost smooth on the disk in ♂, somewhat wrinkled transversely in ♀, each with a row of short erect white setae. *Legs* black, with sparse narrow greenish scales and suberect white setae; front tibiae of ♂ truncate at apex, hind pair slightly curved and granulate on the inner face in both sexes.

Length 5.0-5.5 mm., breadth 2-3 mm.

Kenya: N. slopes of Mt. Kenya, on Embu-Meru road, 4,500 to 5,000 feet, 1 ♂ 2 ♀, ii, 1911 (*Dr. S. A. Neave*).

A very distinct species on account of its dark blue convex elytra with short erect setae, the cylindrical scapes, and the truncate front tibiae in the male.

Genus *Nematocerus* Reiche.

Platyscapus Hustache, Babault's Voy. Afr. Or. Angl., Curc., 1921, p. 28, pl. 2, f. 6 (*n.syn.*).

I can find no single character by which to distinguish *Platyscapus* from *Nematocerus,* for the flattened scape is found also in the latter genus, especially in the females. *Platyscapus* was founded on two specimens of a single species, *oblongus* Hust., which were females, and the male differs notably in the structure of the scape and front tibiae; the scape is very slender, though also compressed, and the front tibiae bear a broad obtuse triangular tooth on the inner edge at one-third from the apex. Another species closely allied to *N. oblongus* is *Systates virescens* Aur., which has an exactly similar sexual dimorphism in the antennae (but not the tibial tooth); this must also be referred to *Nematocerus*.

This proves to be quite a large genus, and in addition to the genotype, *N. metallicus* Reiche, the following species described as *Mitophorus* must be transferred to it: *acerbus* Fst., *aeneipennis* Gerst., *sulciscapus* Aur., and *vittatus* Pasc.

M. inflatus Gerst., is merely the female of *aeneipennis*, and *longirostris* Hust. (cotype seen) is also a synonym of the same species (*n.syn.*).

M. semiaeneus Gerst., *rugicollis* Gestro, and the very remarkable *inflatipennis* Hust., 1938, (all known from description only) may provisionally be placed in *Nematocerus*, because they certainly do not belong to *Mitophorus*.

The species of *Systates* which must be transferred to this genus have already been listed above (p. 314). Among these it must be noted that *mülleri* Hust., is a synonym of *angustirostris* Aur. (*n.syn.*), and the name of *metallicus* Gerst., being preoccupied by the genotype, must be changed to **aereus**, *nom.nov.*

Apart from the difference in the mentum having only two setae instead of four, *Nematocerus* may also be distinguished from the typical forms of *Systates* by the more or less compressed antennal scape (this is sometimes easy to overlook in those males in which this joint is slender), the transverse granulation of the pronotum, and the very shallow straight stria (often obsolete in the middle) separating the rostrum from the frons.

The genus seems to find its highest development in Kenya and Uganda, and extends from Eritrea to the Zambesi (but not south of it) and into the Belgian Congo. From West Africa proper only two or three species are known at present.

Nematocerus subcyaneus, sp.n.

♂♀. Derm deep blue-black; head, rostrum and prothorax with sparse short grey recumbent setae; elytra apparently bare, but with very sparse and very minute setae; prosternum, mesosternum, and the sides of the metasternum and basal ventrite, with small separated grey scales.

Head with variable shallow punctures, which are sometimes partly confluent; frons flat with a very fine shallow median stria, sometimes almost obliterated; eyes strongly convex. *Rostrum* as long as its basal width, narrowing from base to antennae, and moderately dilated at the genae, dorsal area quite flat, very shallowly and confluently punctate, almost parallel-sided, the lateral margins continued to the base, the median carina narrow and flat. *Antennae* red-brown to piceous, with the apices of the joints more or less infuscated; scape compressed, slender in ♂, distinctly broader in ♀, being widest at one-third from base; funicle with the joints elongate and clavate, 1 one-third longer than 2, 7 as long as 3. *Prothorax* transverse, moderately rounded laterally, widest at middle, apex not narrower than base and not constricted; dorsum with transversely confluent shallow punctures, the intervals normally forming flat transverse granules. *Elytra* of ♂ narrowly ovate, widest at one-third from base, of ♀ much broader, widest at middle; dorsal outline of ♂ steep at base and apex but only gently convex on the disk, ♀ much more

convex and the suture not elevated behind; the shallow striae with distinct round punctures, which diminish behind, the broad intervals finely striolate transversely. *Legs* black, with sparse short recumbent white setae; front tibiae of ♂ strongly bisinuate, the apex dorsally produced forwards into a pointed lamina, front tibiae of ♀ much more shallowly bisinuate and truncate at apex; hind tibiae of ♂ strongly curved and sharply dentate internally, those of ♀ more shallowly curved and with small granules.

Length 5.0-5.7 mm., breadth 2.0-2.5 mm.

KENYA: Mumias, 4,200 feet., N. Kavirondo, 1 ♂ 20 ♀, vi, 1911 (type); Nasisi Hills, 20 miles N. of Mumias, 4,800 feet, 2 ♂, vi, 1911; Nandi Plateau, 5,700 to 6,200 feet, 3 ♀, vi, 1911; Ilala, Maramas district, 4,500 feet, 1 ♀, vi, 1911; Valley of Upper Nzoia River, 5,100 to 5,400 feet, 3 ♀, vi, 1911; S. foot and slopes of Mt. Elgon, 5,100 to 5,800 feet, 5 ♀, vi, 1911 (all *Dr. S. A. Neave*).

Nearly allied to *N. pyriformis* Aur. (*Systates*), which, however, has the elytra entirely black, more strongly ovate, being more narrowed apically, much more convex dorsally, with the suture more raised behind and the striae deeper; the front tibiae of the ♂ are only shallowly sinuate.

Nematocerus sericeus, sp.n.

♂♀. Dull black, with fine short grey pubescence; head and rostrum with short recumbent whitish setae; elytra with a stripe of longer pubescence covered with whitish powder on the lateral margins from base to beyond middle.

Head finely shagreened, often with traces of very shallow punctures; frons flat, with a very shallow median sulcus (often obsolete); eyes moderately convex. *Rostrum* a little longer than its width at the genae, parallel-sided from base to scrobes and moderately dilated at the genae; dorsal area parallel-sided, nearly flat, shagreened and almost impunctate, narrowly tricarinate, the marginal carinae extending to base. *Antennae* black to piceous; scape compressed, gradually clavate, somewhat dilated near base, only slightly broader in ♀; funicle very long and slender, with the joints clavate, 1 much longer than 2 (5:3), 7 as long as 4. *Prothorax* a little broader than long, moderately rounded laterally, widest at middle, constricted at apex, which is slightly narrower than base; dorsum with small separated transverse granules. *Elytra* of ♂ rather narrowly ovate, widest at one-fourth from base and rapidly narrowing to apex, much broader and widest at middle in ♀; dorsal outline moderately convex in ♀ and highest at middle, much flatter in ♂ and highest near base; the shallow striae with small close punctures, the intervals flat, finely rugose transversely. *Legs* black, with rather sparse greyish setae; all the femora with a fringe of long setae on the lower face; hind tibiae of ♂ rather strongly curved and granulate internally, without any fringe of setae, those of ♀ much

less curved and more finely granulate. *Venter* of ♂ with a broad shallow longitudinal impression on ventrite 5.

Length 6.5-8.7 mm., breadth 2.5-3.6 mm.

S. ABYSSINIA: Boran, Yavello, 10 ♂ 3 ♀, v, 1941 (*A. F. J. Gedye*).

Closely allied to *N. angustirostris* Aur. (*Systates*), which differs markedly in colouring, having stripes of pale scaling on the prothorax and elytra; the striae on the elytra are deeper and the intervals distinctly convex; the granules on the pronotum mostly bear a large shallow puncture on their anterior edge, which gives them a lunate form; the shape of the elytra in the ♂ is very different, being much narrower and elliptical instead of ovate.

Nematocerus distortipes, sp.n.

♂ ♀. Rather dull black, with sparse minute recumbent pale setae; in fresh specimens the sides and lower surface are probably covered with yellowish powder.

Head with very shallow, more or less confluent punctures; frons quite flat, with an indistinct median furrow; eyes moderately convex. *Rostrum* as long as its width at the genae, parallel-sided from base to scrobes, moderately dilated at the genae; dorsal area parallel-sided, shagreened and almost impunctate, with a distinct median carina and the margins carinate to base. *Antennae* slender, piceous; scape distinctly compressed, abruptly clavate, a little wider in ♀ near base; funicle with the joints long and clavate, 1 a third longer than 2, 7 as long as 3. *Prothorax* transverse (4:5), moderately rounded laterally, widest at or a little behind middle, not or feebly constricted at apex, which is scarcely narrower than base; dorsum with rather dense low transverse ovate granules. *Elytra* of ♂ ovate, widest at one-fourth from base, rapidly narrowing behind, obtusely acuminate at apex, those of ♀ very broad, globose, widest at middle; dorsal outline of ♂ rising steeply near base, highest before middle and gradually sloping with a continuous curve to apex, that of ♀ strongly convex, highest behind middle, very steeply declivous behind, becoming vertical towards apex; the shallow striae with deep close punctures that scarcely diminish behind, the broad intervals finely aciculate transversely. *Legs* black with the claws red, with sparse short recumbent white setae; hind tibiae of ♂ very deeply sinuate and flattened on the apical half of the inner face, and somewhat dilated dorso-ventrally above the sinuation, the inner face rather coarsely granulate, the upper edge bisinuate, the front tibiae truncate at apex; hind tibiae of ♀ only moderately curved and more finely granulate. Venter of ♂ with a very broad shallow median impression on ventrite 5.

Length ♂ 7.0-7.5 mm., ♀ 6.0-7.5 mm.; breadth ♂ 2.7-3.0 mm., ♀ 3.0-4.0 mm.

UGANDA: Mabira Forest, Chagwe, 3,500 to 3,800 feet, 1 ♂ 4 ♀, vii, 1911 (*Dr. S. A. Neave*); between Seziwa River and Kampala, 3,500 feet, 1 ♀, viii, 1911 (*S.A.N.*); Budongo Forest, Unyoro, 3,400 feet, 1 ♀, xii, 1911 (*S.A.N.*), 3 ♂ 5 ♀, x, 1936 (*A. F. J. Gedye*—type); Bwamba Valley, 1 ♀, vii, 1921 (*H. Hargreaves*); *Masindi*, 1 ♀, vii, 1923 (*H.H.*); Entebbe, 1 ♀, iii, 1926 (*Dr. G. D. H. Carpenter*); Jinja, vi, 1940 (*A.F.J.G.*), Mulange, Jinja, 1 ♂, v, 1922.

Belongs to the group of the common, widely distributed *castaneipennis* Hust., the ♂ of which differs in having the elytra much less convex, less wide and less narrowed behind; the front tibiae have the dorsal edge of the apex produced into a point, and the hind tibiae are simply curved and serrately granulate on the inner edge. In the ♀, the elytra are not globose but broadly ovate, much less convex and with the punctures reduced behind; hind tibiae almost straight.

Genus *Mitophorus* Gerst.

Gerstaecker founded this genus on a single species from the Zambesi Valley, *M. pruinosus*, and later added several more species from further north in East Africa. Up till now later authors, having failed to recognise the genotype, have based their concept of the genus on the globose East African species. An examination of the genotype has shown, however, that it is generically distinct from the more northern forms, and I have myself unfortunately redescribed it as *Systates lesnei* Mshl, 1926, (*n.syn.*).

In addition to having only four setae on the mentum, *Systates* differs in having the median carina bifurcate anteriorly near the epistome or interrupted there by a low transverse ridge; whereas in *Mitophorus* the median carina is simple and there is no transverse ridge.

Nematocerus has only two setae on the mentum, and the scape of the antennae is more or less compressed, especially in the female.

Mitophorus vittatus Pasc., and *acerbus* Fst., must be transferred to *Nematocerus*.

I am not acquainted with *Mitophorus semiaeneus* Gerst., or *rugosicollis* Gestro, but from the descriptions they apparently belong also to *Nematocerus*, in which they may provisionally be included.

Mitophorus globosus and *humerosus* Gestro, appear from the descriptions to belong to the genus *Systates*.

M. gravidus Gerst., *pilosus* Hust., and *largus* Mshl., have been transferred to *Phoromitus*, gen.n.

Genue **Systaniris,** nov.

This genus is erected for those species of *Systates* having ten regular striae on the elytra which also present the following characters: Mentum with only two setae on the disk; rostrum with the epistome not extending behind the front margin of the scrobes or only very slightly so; funicle with joint 1 not longer than 2.

On the other hand, typical *Systates* have a transverse row of four setae on the mentum, the epistome extends well behind the scrobes, and joint 1 of the funicle is always longer than 2.

Genotype: *Systates fossulatus* Kolbe.

The other species of *Systates* that must be transferred to this genus are: *angulipennis* Qued., *erinaceus* Hust., *laticollis* Pasc., *maynei* Mshl., *pumilus* Fst., and *ramosus* Mshl.

Genus **Isanates,** nov.

This genus is proposed for seventeen species of *Isaniris* and three species of *Systates* which exhibit the following characters: Dorsal area of rostrum without any deep semicircular incision laterally, mentum with only two setae; funicle with joint 1 longer than 2; elytra with twelve or more rows of punctures, usually very irregular; corbels of hind tibiae entirely open.

Genotype: *Isaniris gerstaeckeri* Fst.

Isaniris differs from this genus in having the dorsal area of the rostrum very deeply incised laterally by the scrobes, almost in the form of a semicircle, the mentum bearing four setae; the funicle has joint 1 equal to or shorter than 2; and the corbels of the hind tibiae are narrowly enclosed.

Systates differs principally from *Isanates* in that the mentum bears four setae and the elytra have ten regular striae.

In addition to the genotype, the following sixteen species of *Isaniris* must be assigned to this genus:—

australis Mshl.
bidentulus Fst.
filicornis Hust.
hamaticollis Hust.
lanipes Hust.
laticeps Hust.
lectus Hust.
pilipes Hust.
pusillus Hust.
rana Hust.
saegeri Hust.
setipennis Hust.
seydeli Hust.
sinuatus Fst.
spinithorax Hust.
veterator Hust.

The following species of *Systates* must also be included: *armiger* Klb., *bispinosus* Hust., and *irregularis* Fst.

Of the species known at present more than half (eleven out of twenty-one) have been recorded from the Belgian Congo, seven occur to the eastward from Italian Somaliland to the Zambezi Valley, and only three from West Africa.

Isanates vansomereni, sp.n.

♂ ♀. Derm black, unevenly clothed with grey, pale green or pinkish scales; pronotum with the bare granules showing through the scales, which often form a narrow denser median stripe; elytra with the scales partly dispersed and partly collected in patches, rather denser laterally and apically, and with an indefinite macular stripe on interval 3.

Head with the bare vertical area extending right up to the eyes, its anterior margin well-defined and arcuate in the middle; frons flat, not narrowed in front, much wider than the length of an eye (5:3), with a deep median sulcus; eyes strongly convex (sometimes almost subconical), deepest much behind middle. *Rostrum* a little longer than broad, slightly wider at the genae than at base, with the sides sinuate; dorsal area somewhat convex at base, impressed in front just behind the transverse ridge, the median carina fine and often hidden by scaling, the lateral carinae converging anteriorly but not incised by the scrobes; inter-antennal area bare, with a feeble median carina. *Antennae* piceous, elongate and slender; scape gradually clavate, with narrow scales and subrecumbent setae. *Prothorax* transverse (♂ 6:7, ♀ 6:8), strongly rounded laterally, widest at middle, distinctly sinuate at base which is as wide as apex; dorsum strongly convex longitudinally, highest at middle, lower at base than at apex, with separated low bare setigerous granules showing through the scaling. *Elytra* broadly ovate in ♂, broader and subglobose in ♀, sinuate at base, with the basal angles projecting forwards; dorsum moderately convex longitudinally in ♂, strongly so in ♀, with about fourteen very irregular rows of punctures, and on the disk rows of stiff brown erect setae, which become shorter, white, spatulate and subrecumbent on the declivity. *Legs* black, with dense white scaling and black spots from which arise short recumbent setae; front tibiae of ♂ shallowly bisinuate and with a fringe of long setae beneath, hind tibiae strongly curved and flattened and glabrous on the inner face without granules; front tibiae of ♀ almost straight, hind tibiae less curved and finely denticulate on the upper and lower edges of the flattened glabrous inner face. *Venter* of ♂ with the last ventrite not impressed.

Length 5-7 mm., breadth 2.3-3.7 mm.

KENYA: Shimba Hills, 10 ♂ 7 ♀, vii, 1939, 10 ♂ 4 ♀, iii, 1941 (*V. G. L. van Someren*); Gasi, 2 ♂ 2 ♀, xi, 1927 (*V. G. L. van Someren*); Rabai, 7 ♂ 11 ♀, viii, 1937 (*V. G. L. van Someren*—type), 1 ♀, ii, 1929 (*A. F. J. Gedye*).

Allied to the West African *I. gerstaeckeri* Fst., which has a longer and apically more dilated rostrum, the dorsal area being much narrower and not impressed; the prothorax is narrower, truncate at base and much less convex, as also are the elytra; the hind tibiae are not glabrous or flattened on the inner face,

but granulate, and those of the ♂ have a fringe of long hairs; and the last ventrite of the ♂ has a broad median sulcus.

Genue **Machaerorrhinus,** nov.

Head with the frons broadly and deeply impressed, without any median stria; eyes very convex. *Rostrum* with the dorsal area very broad, without any median carina, its lateral margins each bearing a broad suberect curved horn extending backwards over the head; epistome extending backwards further than usual, but its posterior margin obliterated in the middle; scrobes almost lateral, being overhung by the dorso-lateral margin and only partly visible from above anteriorly; mentum with only two setae. *Antennae* with the scape stout, gradually clavate; joint 1 of funicle a little shorter than 2. *Prothorax* very deeply and coarsely punctate, the base sinuate and broadly bevelled. *Elytra* with 12 quite regular striae. *Legs* with the corbels of the hind tibiae very broadly enclosed. *Sternum* with the mesepimera extending narrowly to the base of the elytra.

Genotype: *Isaniris bicornutus* Hust., 1937.

This very aberrant monotypic genus is included here only because it was described as an *Isaniris;* the broadly enclosed corbels of the hind tibiae and the elongate mesepimera indicate that its proper place is in the multistriate Embrithini and not in the Peritelini.

Genus **Isaniris** Thoms.

As here restricted, this genus contains only four described species: *viridimicans* Thoms. (genotype), *thomsoni* Fst., *decorsei* Hust., and *letestui* Hust., and is confined to West Africa.

Myllocerus mystacinus, sp.n.

♂♀. Derm black, with dense brown and grey scaling above and uniformly pearly grey beneath; head brown, rostrum grey or brown; pronotum brown, with a grey median stripe which narrows to a point in front and widens at base, the lateral margins showing narrowly the grey scaling of the lower surface; elytra variably mottled with grey and brown.

Head with the frons as wide as the dorsal area of the rostrum, the median sulcus of the latter slightly encroaching on the head and behind it a very short median stria; eyes lateral, only slightly convex. *Rostrum* very little longer than its basal width, parallel-sided in the basal half and moderately dilated at the genae; dorsal area gradually narrowing from base to apex, with a broad median sulcus; epistome with its margin almost semicircular, its

sides with an overhanging fringe of very broad setae; mentum with two setae. *Antennae* black, with dense grey scaling; scape gently curved, gradually clavate, with short recumbent setae; funicle with joint 1 a little longer than 2, the rest subequal, longer than broad. *Prothorax* about as long as broad in ♂, more transverse in ♀, almost parallel-sided, moderately bisinuate at base, not constricted at apex, which is vertically truncate laterally; dorsum even, the sculpture hidden by scaling and recumbent squamiform setae. *Scutellum* very small, round, with grey scaling. *Elytra* much wider than the prothorax at the roundly rectangular shoulders, parallel-sided to beyond middle in ♂, slightly wider behind in ♀, jointly rounded at apex; the striae visible through the scaling as fine lines with only traces of punctures, the intervals feebly convex, with slightly overlapping striolate convex scales and with a row of very short recumbent spatulate setae. *Legs* black, with dense grey scaling; femora without a tooth, front tibiae not sinuate beneath.

Length 2.7-3.7 mm., breadth 1.2-1.6 mm.

KENYA: Stony Athi, 10 ♂ 26 ♀, v-viii, 1940 (Biological Survey, Nat. Hist. Soc.).

An aberrant species, characterised by the lack of a spine on the femora, the unusually elongate head and rostrum, and the curious scale-like setae on each side of the epistome.

Subfamily *TANYRRHYNCHINAE*.

Lecanophora constricta Hust.

This species was assigned to the genus *Epeigorrhinus* (=*Sympiezorrhynchus*) by Hustache (Miss. biol. Paese Borana, ii, Zool, 1939, p. 632), but a series before me taken by Mr. A. F. J. Gedye at the type locality, Yavello, S. Abyssinia, shows that it is really a *Lecanophora*. The species of this genus present two characters that have not been previously noted: the elytra bear twelve rows of punctures and their apex is produced downwards like a beak in both sexes.

Lecanophora neavei, sp.n.

♂♀. Derm black, densely and uniformly clothed above with pale bluish green or bluish grey scaling; underside with less dense grey scales.

Head densely squamose, the frons two-thirds the width of an eye and nearly twice as wide as the narrowest space between the scrobes, with a median stria; eyes absolutely flat, continuous with the curvature of the head. *Rostrum* a little shorter than the pronotum, gradually widening from base to apex; dorsal area wider than the frons, sharply narrowed where it is excised by the scrobes, almost flat behind the antennae, concave in front, densely squamose, the scales almost concealing the median carina; lateral areas with a sharp carina running with a slight

curve from middle of scrobe to middle of eye, and below this a narrow strip of dense fine punctures which does not extend on to the genae. *Antennae* ferruginous; funicle with joint 2 equal to or slightly longer than 1, the rest gradually diminishing distally. *Prothorax* widest at base, where its sides form an absolutely continuous line with those of the elytra, narrowing rapidly with a slight curve to the apex, where it is very shallowly constricted; dorsum with every puncture covered by a scale, leaving only very narrow bare intervals, without evident setae. *Elytra* very broadly ovate in both sexes, densely squamose, with a small bare spot at the base of the suture, the setae minute and inconspicuous even on the declivity. *Legs* ferruginous, the scaling sparse, but dense on the distal half of the femora dorsally; all the tibiae with rather sparse small denticles.

Length 3.5-5.5 mm., breadth 2.0-3.2 mm.

KENYA: N. Kavirondo, Valley of Upper Nzoia River, 5,100 to 5,400 feet, 6 ♂ 9 ♀, vi, 1911 (*Dr. S. A. Neave*).

Closely allied to *L. constricta* Hust., which differs as follows: frons as wide as an eye and three times as wide as the narrowest space between the scrobes; eyes slightly convex; rostrum with the dorsal area not wider than the frons, the lateral areas much more steeply declivous, the punctate area below the lateral carina much broader, with much coarser punctures and extending on to the genae; prothorax not constricted at apex; elytra with the apex more pointed, the setae short but much more conspicuous.

Subfamily *OTIORRHYNCHINAE.*

Bethaeus, gen.nov.

Head shallowly constricted behind the eyes, the impression continuing across the dorsum, separated from the rostrum by a deep angulated sulcus (partly obscured by scaling); frons somewhat narrower than base of rostrum; eyes lateral, strongly convex. *Rostrum* broad, parallel-sided or dilated at the genae; epistome undefined; mandibles multisetose; bearing a few scales; mentum multisetose, sessile. *Prothorax* subconical, deeply bisinuate at base. *Elytra* much wider at the prominent subrectangular shoulders than the prothorax, parallel thence to beyond middle, jointly rounded at apex, trisinuate at base, with ten regular striae, without any posterior callus. *Wings* functional. *Legs* with front coxae nearer to front margin of prosternum, hind coxae touching elytra; trochanters without a seta; femora short, clavate, unarmed; tibiae straight, not denticulate, front pair slightly produced outwards at apex, corbels of hind pair broadly enclosed, bare internally, tarsal claws connate. *Sternum* with the mesipimera large, reaching the base; metepisternal suture complete. *Venter* with the intercoxal process arcuate, rather narrower than a coxa; ventrite 2 a little longer than 3 and separated from 1 by a straight incision.

Genotype: **Bethaeus varius,** sp.n.

Belongs to the Episomini, in which small tribe there are only two other African genera that are capable of flight, viz., *Platyomicus* Thoms., and *Catamonus* Schönh. (misplaced in *Catalogus Coleopt.*). The species of the former genus are large insects with a very different facies; the scrobes are strongly convergent, joint 2 of the funicle is much longer than 1, the base of the prothorax is truncate, the elytra multistriate, the corbels of the hind tibiae densely squamose internally, etc.

Catamonus has comparatively a much longer rostrum, with the scrobes lateral, and the setae on the mentum are confined to the front margin; the head is not constricted behind the eyes; and the first ventral suture is sinuate in the middle.

The West African genus *Zyrcosa* Pasc., which is placed in the tribe Episomini in *Catalogus Coleopt.*, belongs to the subfamily *Brachyderinae* in the tribe Dermatodini.

Bethaeus varius, sp.n.

Derm black, with dense brown or greyish brown scaling and very variable faint paler and darker markings, but often showing

signs of a common postmedian transverse pale patch extending to stria 3 and followed by a usually V-shaped brown marking; underside with uniform dense grey scaling.

Head with the eyes almost touching the prothorax when fully retracted; frons flat, longitudinally wrinkled, with a very broad deep median sulcus, but the sculpture hidden by dense scaling and the sulcus appearing only as a narrow line; eyes highest behind the middle. *Rostrum* as long as broad, parallel-sided throughout; dorsal area flat or very slightly depressed in the middle, with no definite margin laterally, sculptured like the frons, but only a narrow median line showing through the scaling; scrobes nearly parallel, so that the interscrobal area is almost parallel-sided. *Antennae* densely squamose, scape broad, short, reaching only to hind margin of eye, widening from base to apex, with overlapping scales and short recumbent setae; funicle with the two basal joints equal, distal joints longer than broad, 7 longer than 6; club rather short, ovate. *Prothorax* transverse (2:3 or 3:4) widest at the base, with the sides almost straight and gradually narrowed to apex, where it is usually, but not always, shortly constricted (when the constriction is deeper, the apical angles may rarely project); apical margin arcuate; dorsum flat longitudinally, with a shallow round impression on each side behind middle, closely set with small low granules that are entirely hidden by scaling, the scales being scarcely larger than those on the elytra. *Elytra* broad, oblong-ovate, almost vertically declivous behind, the shallow striae partly covered by scaling, but the small bare punctures visible throughout; the intervals slightly convex, of equal height, with overlapping convex scales and very small appressed inconspicuous setae. *Legs* with dense grey and brown scaling.

Length 4.5-7.5 mm., breadth 2.3-3.3 mm.

KENYA: Lower Tana-Sabaki Rivers, 4 ♀, 4, v, 1932 (*Turner* and *McArthur*); Mwingi, Kitui, 4 ♀, xi, 1940 (*T. H. E. Jackson*—type); Garissa Road, Mile 245, 9 ♀, xi, 1940 (*A. R. Melville*).

Bethaeus canus, sp.n. ♀ (Fig. 1).

Derm black, with dense uniform pearl-grey scaling above; underside with similar but sparser scales. *Head* with the frontal median sulcus very broad and deep, the frons coarsely rugose, and highest next to eyes, which are highest nearly in the middle. *Rostrum* a little longer than broad, parallel-sided in the basal half and rather strongly dilated at the genae; dorsal area with a strong smooth median carina and two ill-defined sinuous carinae on each side; scrobes turning inwards, and the interscrobal area strongly dilated in front. *Antennae* less densely squamose; scape comparatively slender, gradually widening from base to apex, extending well beyond the front margin of the prothorax, with rather sparse narrow scales and subrecumbent setae; funicle with joint 2 a little longer than 1, 6 as long as

broad, the rest longer; club elongate, fusiform. *Prothorax* transverse (2:3), subconical, rapidly narrowing in front, broadly but shallowly constricted at the apex, the apical margin truncate; dorsum flat longitudinally in the middle, without impressions, set with rather large separated punctures concealed by dense scaling, the scales being round and nearly twice as long as those on the elytra. *Elytra* broad, oblong-ovate, vertically declivous at the apex, the shoulders more sloping than in *B. varius* and thus forming a much wider angle with the sides of the prothorax; the striae shallower and even more covered with scales, so that the punctures show through as narrow black slits; the intervals flat, with dense overlapping scales and inconspicuous appressed setae. *Legs* with uniform darker grey scales.

Length 9 mm., breadth 4.1 mm.

Kenya: Lower Tana-Sabaki Rivers, 1, ♀, 4, v, 1932 (*Turner* and *McArthur*).

The larger size, the carinate and apically dilated rostrum, the widening interscrobal area, and the punctate pronotum, will readily distinguish this species from the genotype.

Catamonus laticollis, sp.n. ♂♀.

♂. Derm rather shiny black; pronotum with an indefinite median stripe of sparse pearl-coloured lanceolate scales; elytra with very long erect dark setae, a sutural stripe of buff-coloured scales and the following markings of pearly scales: a stripe on interval 7 from the shoulder to the middle, a small patch at middle on 3 and 5, another before middle on 9, a short stripe near the declivity on 3, 5, 7, 9, a spot at the conjoint apex of 3 and 9, and a narrow marginal stripe from the level of ventrite 2 to the apex; the sides of the mesosternum, metasternum and of the two basal ventrites with fairly dense pearly scales.

♀. Rarely almost like the male above; normally sparsely covered throughout with buff and whitish scales, the short posterior stripes of the male on intervals 3, 5, 7, 9 indicated by denser scaling; underside with fairly dense pearly scales throughout.

Head with a very shallow transverse impression behind the eyes, which project very slightly beyond the temples; frons somewhat depressed in the middle, rugosely punctate, with a deep median sulcus but no lateral ones, and without any definite costa by the eyes. *Rostrum* stout, about as long as the pronotum, parallel-sided in the basal half, dilated at the genae; dorsal area flat, coarsely punctate, without any median carina, but with a strong lateral carina on each side (these converging slightly behind) and bounded anteriorly by a transverse ridge between the antennae; lateral areas with at most a very shallow longitudinal sulcus above the scrobe. *Antennae* piceous, with sparse setiform pale scales and subrecumbent setae on the scape; funicle

with the two basal joints equal, 3 longer than 4, 4-7 subequal, somewhat longer than broad, clavate. *Prothorax* transverse (2:3), very strongly rounded laterally, widest behind the middle, the bisinuate base broader than the apex; dorsum unusually flat, with fairly close strong punctures and a broad shallow transverse impression at base, without any median furrow; male with sparse hairlike pale scales, except for a loose median stripe of broader lanceolate scales, and with sparse long erect setae; female more evenly covered with separate broad scales. *Elytra* jointly trisinuate at base, parallel for a short distance behind the prominent roundly-rectangular shoulders; the shallow striae with large deep close punctures, stria 5 strongly curved inwards at the base, 6 not reaching base but ceasing at the shoulder; intervals slightly convex, with sparse fine punctures, and very long irregular erect dark setae. *Legs* red-brown (sometimes piceous), with more or less confluent strong punctures and dispersely squamose; hind femora of male with the usual deep incision at the base of the dorsal edge and the hind coxae broadly and deeply impressed.

Length 8-10 mm., breadth 3.3-4.5 mm.

TANGANYIKA: Msagaa, 35 miles east of Singida, 12 ♂, 12 ♀, 10, xii, 1935 (*E. Burtt*).

Readily distinguished from all the previously described species by the very broad, laterally rounded and dorsally flattened prothorax, as well as by the very long setae on the elytra and the absence of a median carina on the rostrum.

Anaplesius Mshl., 1935.

When revising the East African genera of Embrithini with ten striae on the elytra [Ann. Mag. Nat. Hist. (ii), ix, 1942. p. 6], I separated *Ischnobrotus* Hust., 1936, from the present genus mainly on the completeness or otherwise of the metepisternal suture—usually a reliable character. But on re-examination of all of the available species, it has become clear that this suture is so variable in development that it cannot be relied upon as a generic distinction in this instance. *Ischnobrotus* (genotype: *typicus* Hust.) must, therefore, be treated as a synonym of *Anaplesius*.

The genus falls into two groups: (*a*) those species having a bare callus at the base of the elytra on each side of the suture (*granulicollis* Hust., *typicus* Hust., *subcostatus* Hust., *convexus* Hust., *bicallosus* Hust.); and (*b*) those without any trace of a callus (*nebulosus* Aur., *hystricosus* Hust., *setulosus* Hust., *kenyae* Hust., *gedyei* Mshl., *rhombifer* Mshl.).

Systates macarthuri, sp.n., ♂ ♀.

Derm rather shiny black; head and prothorax with sparse narrow scales; elytra with variable rows of spots formed of narrow fusiform pinkish-white scales on intervals 3 and 9, and

partly also on 5 and 7, and similar scales sparsely scattered elsewhere; these rows are more distinct in the male, and the scattered scales are more numerous in the female.

Head with very shallow, longitudinally confluent punctures, frons flat with a deep median sulcus; eyes of female only slightly convex, not extending laterally beyond the temples, those of male a little more convex. *Rostrum* a little longer than its greatest width, parallel-sided in the basal half and strongly dilated at the genae; the dorsal area parallel-sided behind the scrobes, distinctly carinate laterally and with a strong higher median carina, without any transverse elevation behind the epistome. *Antennae* elongate, black; scape gradually clavate, with sparse recumbent setae; funicle with joint 1 a little shorter than 2+3, distal joints clavate, 7 as long as 4. *Prothorax* a little broader than long, strongly rounded laterally, widest at middle, slightly narrower at apex than at base; dorsum moderately convex longitudinally, highest behind the middle, closely set with large flat setigerous granules, without any smooth median line. *Elytra* narrowly ovate, much broader in female, immarginate and unconstricted at base; dorsal curvature slight in male and steeply declivous at apex, more convex in female and vertical at apex, which is not produced downwards; the shallow striae with large subquadrate punctures separated by narrow septa, the intervals not (male) or slightly (female) broader than the punctures, set with much flattened granules (becoming higher behind) in female, those in male much smaller and sparser, and with a row of short suberect pale setae that are more conspicuous behind. *Legs* black, with sparse narrow pale scales; tibiae of male clothed beneath with sparse long pale setae, hind pair rather shallowly sinuate and flattened on the inner face in the apical half without any angulation; hind tibiae of female with the dorsal edge slightly sinuate.

Length 5.5-10.0 mm. breadth 2.2-5.0 mm.

KENYA: Mutha, 2 ♂, 3 ♀, xi, 1933, 1 ♀, xi, 1937 (*C. G. MacArthur*); Kibwezi, 1 ♀, xi, 1936 (*C.G.M.*); Kanziko, 1 ♂, ix, 1936, 2 ♂, v, 1937 (*C.G.M.*); Athi Falls, 2 ♂, vii, 1937 (*C.G.M.*); Umoa, Nziu, 1 ♀, xii, 1938 (*C.G.M.*); Malindi, 1 ♂, v, 1940 (*G. W. Jeffery*); Ikutha, 1 ♂, i, 1942 (*C. G. MacArthur*—type).

In facies and scaling this species looks much like *S. lepidotus* Hust., which, however, may be readily distinguished by having the elytra strongly constricted at the base, its basal margin being elevated with the lateral angles projecting.

Structurally *S. macarthuri* is much closer to *S. crenatipennis* Fairm., which is uniformly clothed with small narrow scales; the eyes are rather more prominent, the median carina on the rostrum more raised, the granules on the pronotum rather less flattened, and the sinuation on the hind tibiae of the male is much deeper, forming a distinct angle at its upper end.

Systates cornicollis, sp.n. ♂♀ (Fig. 2).

Derm rather shiny black, with patches of pale greenish or whitish scaling; prothorax with an indefinite stripe of denser scaling on each side of the median elevation and another lateral one; elytra with variable rows of spots on the intervals.

Head finely aciculate, with denser scaling laterally, the median sulcus narrow but deep; eyes moderately convex, highest behind the middle. *Rostrum* a little longer than broad, of equal width at base and apex, and shallowly sinuate laterally; the dorsal area almost parallel-sided behind the scrobes, higher near the base than the frons, sharply carinate laterally, shallowly impressed in front and with a fine median carina; the inter-antennal area shallowly impressed, rugulose. *Antennae* with the scape long, very slender, abruptly clavate, with hair-like grey scales and recumbent setae; funicle with joint 3 longer than 4, 4-7 subequal. *Prothorax* transverse, moderately rounded laterally, widest at middle, shallowly constricted at apex, truncate or shallowly sinuate at the narrowly marginate base, which is not wider than the apex; dorsum shagreened, with sparse flattened granules, and in the middle of the disk a horn-like elevation, slightly curving backwards and narrowly bifurcate at its apex. *Elytra* ovate in male, broader in female, widest before the middle, not produced downwards at apex in female, immarginate at base, the dorsal outline strongly convex; the very shallow striae with large close transverse punctures, each with a minute granule on its anterior edge; the intervals not wider than the striae, impunctate, with a sparse row of erect pale setae. *Legs* with sparse pale scales; hind tibiae somewhat curved, those of male with a fringe of long pale setae, those of female finely granulate, front tibiae of male also with a fringe; joint 2 of hind tarsi much longer than 3.

Length 5.0-6.5 mm., breadth 2.5-3.5 mm.

NYASALAND: Karonga, 20 ♂, 18 ♀, vii, 1910 (*Dr. S. A. Neave*).

Very closely allied to *S. alticollis* Mshl. (Bull. Ent. Res., XXV, 1934, p. 497, Fig. 1), from Tanganyika, which, however, differs in the form of the dorsal process on the pronotum, this being much thicker in both directions, more broadly bifurcate at the apex and distinctly angulated on its posterior slope.

Nematocerus rotundus, sp.n., ♂♀.

Derm dull black, entirely devoid of scaling, practically bare dorsally, except for minute sparse setae, but the lateral margins of the elytra beyond stria 9 with a stripe from the base to the hind coxae formed of short grey setae.

Head separated from the rostrum by a rather deep stria having only a small angulation in the middle, with shallow and often confluent punctures and a deep median sulcus; eyes moderately convex. *Rostrum* a little longer than its width at the genae, slightly narrowing from base to antennae and strongly

dilated at apex; dorsal area parallel-sided behind the scrobes, almost flat, obtusely marginate laterally, with shallow confluent punctures and a rather broad low median carina. *Antennae* with the scape piceous, the funicle red brown with the apices of the joints infuscate; scape rather broadly compressed and dilated near base (especially in female), abruptly clavate; funicle very long and slender, with the joints clavate, 1 twice as long as 2, 2 not or very slightly longer than 3. *Prothorax* nearly as long as broad, moderately rounded laterally, widest at middle, not constricted at apex, which is a little narrower than base; dorsum with dense low transverse granules. *Elytra* ovate in male, much broader and subglobose in female; dorsal outline of female strongly convex, highest at middle, vertically declivous at apex without any sinuation; the shallow striae with close punctures separated by granules on the dorsum, the intervals flat, opaque, transversely shagreened, with traces of minute flattened granules. *Legs* black (except the red claws) with sparse short pale setae; hind tibiae of male rather strongly sinuate and granulate on the inner face, those of female less sinuate; front tibiae of male not produced into a point at apex. *Venter* of male with a broad shallow median depression on ventrite 5; ventrite 5 of female almost flat.

Length ♂ 7.5-8.5 mm., ♀ 8.0-9.5 mm., breadth ♂ 3.0-3.3 mm., ♀ 3.9-4.5 mm.

Kenya: Nairobi, 5,450 feet, 3 ♂, 3 ♀, x, 1920 (type), v, 1921, xi, 1926 (*A. F. J. Gedye*), 2 ♂, 3 ♀, i, v, 1921, 1 ♀, xi, 1923 (*Dr. V. G. L. van Someren*), 1♂, xi, 1923 (*Rev. J. W. Hunt*), 1 ♂, x, 1929 (*Guy A. K. Marshall*); Thika, 1 ♂, i, 1921, 2 ♂, v, 1930 (*A.F.J.G.*); Machakos, 1 ♂, xii, 1923 (*J.W.H.*).

Very closely allied to the widely distributed *N. castaneipennis* Hust. (*Systates*), which it seems to replace round Nairobi. Hustache's species, which is also black (having unfortunately been described from teneral specimens), is a much narrower insect in both sexes and also shows the following differences: the dorsal area of the rostrum is much more finely sculptured, being usually shagreened with a narrower median carina; the frontal stria is much shallower and sometimes almost obliterated; joint 2 of the funicle is distinctly longer than 3; the punctures on the elytra are not separated by granules, and in the female the posterior declivity is deeply sinuate above the apex, and the front tibiae of the male are produced into a point dorsally at the apex.

Subleptospyris turneri, sp.n. ♂♀.

Derm red-brown to piceous, rather shiny; head, rostrum and pronotum with sparse setiform whitish scales; elytra with small, ovate or round, non-contiguous, pale coppery scales, more or less interrupted by indefinite bare spots, which often form

a regular row on intervals 2, 4 and 6, especially in the female; underside with very sparse pale setae.

Head with shallow punctures that are sometimes longitudinally confluent laterally, and an elongate frontal fovea; eyes moderately convex. *Rostrum* longer than its width at the genae (4:3 in male, 3:2 in female), about as wide at base as at genae, with the sides sinuate; dorsal area flat, obtusely marginate laterally, parallel-sided behind antennae, with obsolescent punctures and a low median carina; interantennal area concave, shallowly rugose, the epistome limited by a distinct curved carina. *Antennae* red-brown; scape gradually clavate, with sparse suberect setae; funicle with joint 1 longer than 2, 3 longer than 4, 4-6 equal and clavate, 7 as long as 3. *Prothorax* slightly transverse in male (11:13), a little broader in female (11:15), moderately rounded laterally, widest behind the middle, shallowly constricted at apex, which is narrower than the feebly arcuate and narrowly marginate base; dorsum feebly convex longitudinally, highest behind middle, with strongly flattened large confluent granules, without any smooth median line. *Elytra* ovate in male, much broader in female, jointly sinuate at base, obtusely acuminate at apex; the dorsal outline gently convex, highest at about middle, rather steeply declivous behind; scarcely striate, with more or less irregular rows of deep round separated punctures, the first four to six rows fairly regular in male, less so in female; the pale setae very short and recumbent, except at the extreme apex where they are longer and erect, female without any erect setae on upper part of declivity. *Legs* piceous, with sparse pale setae, the posterior pairs of femora with a loose band of scales; tibiae not compressed, with 3-4 sharp spines on inner edge near apex, front pair not incurved at apex. *Venter* with sparse obsolescent punctures, ventrite 1 striolate along the basal margin.

Length 5.7-7.5 mm., breadth 2.5-4.0 mm.

Kenya: Londiani, 9,000 feet, 3 ♂, 2 ♀, v, 1936 (*H. J. Allen Turner*—type): Molo, 9,000 feet, 3 ♀, v, 1939 (*Trench*).

Closely allied to *S. sparsuta* Mshl., from the Chyulu Hills, which differs in the following characters: the epistome is quite undefined; the opaque pronotum is much more finely sculptured, more rounded laterally and not constricted at the apex; the elytra are more opaque, with larger and less regular punctures, and in the female they bear a short row of erect setae on the declivity of interval 1.

After the description of *S. sparsuta* (J.E. Afr. Ug. N.H. Soc., XV, 1940, p. 46) it was inadvertently stated that the tibiae of *S. turbida* Mshl., are not compressed; in fact they are markedly compressed.

Myllocerus athianus, sp.n., ♂ ♀.

Derm piceous, densely squamose above and below, head and rostrum dark brown, the former normally with an irregular

paler transverse band; pronotum dark brown, with an indefinite paler stripe on each side of the disk; elytra very variable in colour—typically, dark brown on the disk as far as stria 5 or 6 and paler greyish to fulvous laterally, with an oblique greyish patch before the middle between striae 2 and 6 and a transverse greyish patch at the top of the declivity between striae 1 (or 2) and 4, but the whole dorsal area is liable to be suffused more or less with light brown or grey; underside uniformly grey.

Head longitudinally striolate (hidden by scaling), with only a short median stria visible; eyes not very convex; frons wider than the dorsal area of the rostrum, flat transversely. *Rostrum* nearly as long as broad, parallel-sided in the basal half, moderately dilated at the apex; dorsal area ill-defined basally, rapidly narrowing in front, depressed, with a bare median line anteriorly; epistome bounded by a sharp, almost semicircular carina; mentum with four setae. *Antennae* red-brown; scape not reaching to middle of prothorax, gradually clavate, with rather dense narrow grey scales and subrecumbent setae; funicle with joint 1 longer than 2, the distal joints longer than broad, club as long as the two preceding joints. *Prothorax* nearly as long as broad, truncate and of equal width at base and apex, almost parallel-sided, slightly rounded laterally in the middle and very shallowly constricted near the apex, the latter somewhat obliquely truncate laterally; dorsum with dense scaling and short recumbent setae, with a rather deep rounded impression on each side behind the middle. *Scutellum* oblong or subquadrate, bare, shiny. *Elytra* much wider at the roundly rectangular shoulders than the prothorax, slightly widened behind the middle in male, more so in female; the striae visible through the scaling as very fine bare lines containing small shallow punctures, the intervals feebly convex, with a row of short erect spatulate setae. *Legs* red brown, with dense grey or brown scaling; femora with only a minute tooth; tibiae rather slender, not bisinuate on the inner edge.

Length 3.3-3.7 mm., breadth 1.4-1.6 mm.

KENYA: Stony Athi, 4 ♂, 6 ♀, vi, 1940 (E.A.U. Nat. Hist. Soc. Biol. Survey).

Very close to *M. alboscutellatus* Hust., 1934, from the Congo, which may be distinguished by its oval, densely squamose scutellum and the shorter subrecumbent setae on the elytra; also the antennal scape is somewhat longer and the club as long as the three preceding joints; the tibiae are shorter and bisinuate on the inner edge.

Myllocerus horridulus, sp.n., ♂ ♀.

Derm black, with dense uniform pale metallic green scaling throughout.

Head with the fine shallow striolation entirely hidden by scaling, the setae short and recumbent; frons convex transversely,

PLATE 73.

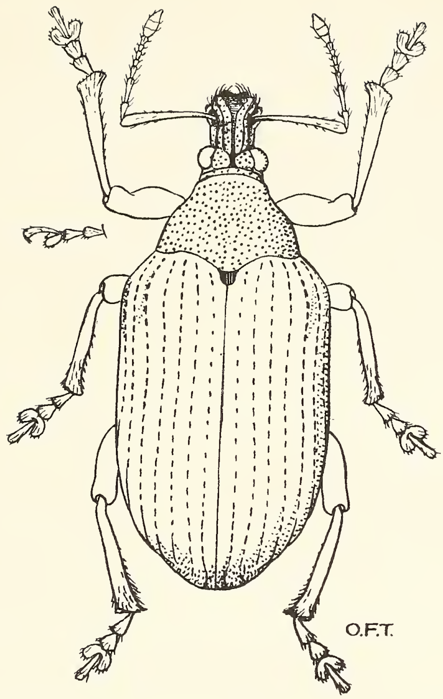

Fig. 1. *Bethaeus* (g.n.) *canus*, sp.n. ♀.

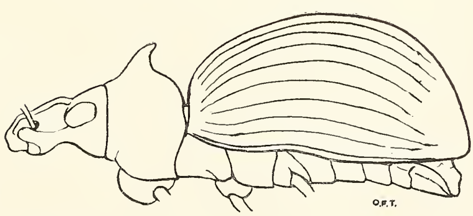

Fig. 2. *Systates cornicollis*, sp.n. ♂.

PLATE 74.

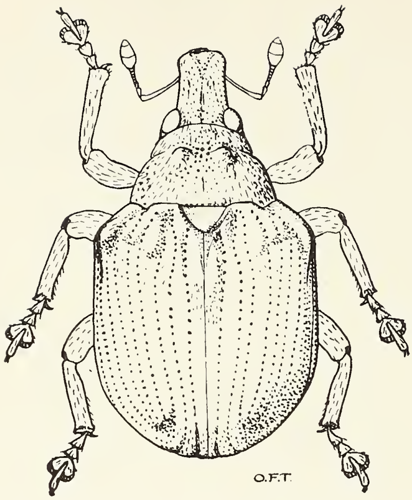

Fig. 3. *Omophorus boxi*, sp.n. ♂.

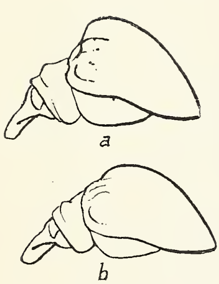

Fig. 4.

(a) *Omophorus indispositus* Boh.
(b) *Omophorus boxi*, sp.n.

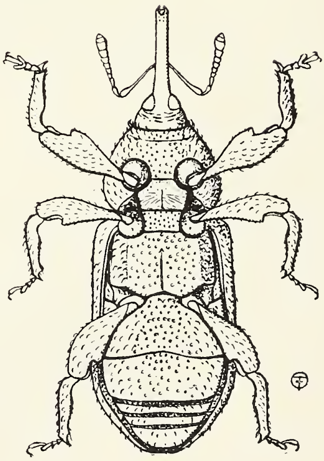

Fig. 5.

Peltostethus gedyei, sp.n. ♀.

much wider than the ill-defined dorsal area of the rostrum, without any median stria or puncture; eyes lateral, only slightly convex. *Rostrum* as long as broad, the sides almost parallel or very shallowly sinuate; dorsal area very ill-defined behind, narrowing in front and depressed in the middle; epistome bounded by a low curved carina; mentum with four setae. *Antennae* red, with sparse fine recumbent setae; scape rather stout, gradually clavate; funicle with joint 1 half as long again as 2, 4-7 longer than broad, subequal; club as long as the 3½ preceding joints. *Prothorax* transverse (5:6), feebly rounded laterally, widest a little behind the middle, truncate at base and apex, the latter somewhat narrower and obliquely truncate laterally; dorsum with the rugose punctures entirely hidden by dense scaling and recumbent clavate setae, and with a very shallow round impression on each side behind middle. *Scutellum* small, round, with sparse green scales. *Elytra* comparatively narrow at the obliquely rounded shoulders, widest behind the middle, only slightly wider in the female; the striae narrowly visible through the scaling and with small shallow bare punctures, the intervals flat, with dense convex overlapping scales and with a dense row of moderately long stiff erect spatulate whitish setae. *Legs* red, with grey or greenish scaling; femora with a very minute tooth, often obsolescent.

Length 2.9-3.3 mm., breadth 1.2-1.5 mm.

TANGANYIKA: Ngorongoro, 9 ♂, 5 ♀, iv, 1941.

Comes nearest to the still smaller *M. micros* Hust., from the Congo; but the latter has the hind margin of the epistome not carinate in the middle and the frons bears a fine median stria; the subrectangular shoulders of the elytra much more prominent, and the setae are much shorter.

Subfamily *NANOPHYINAE*.

Nanophyes analis, sp.n., ♂♀.

Derm testaceous; head with a dark stripe behind each eye; rostrum more or less blackish behind the antennae; prothorax with an indefinite dark stripe on each side of the disk and a large dark spot near the basal angles (sometimes obsolete); elytra with a large common brown basal triangle with a blackish spot on its hind margin on interval 3, a variable elongate brownish spot at about middle on 3 and a brownish sutural stripe on the declivity; underside with the metasternum, the middle of the mesosternum, and the venter (except a large yellow patch in the middle of ventrite 5), black.

Rostrum forming a continuous line with the frons, very slightly longer than the head and pronotum in both sexes, straight from base to antennae and then slightly curved, the apical portion less than half the length of the scape in ♂, two-thirds in ♀; the post-antennal part dorsally with three carinae in

♂ with impunctate adjoining sulci, the carinae more or less reduced in ♀ and the shallow sulci with a row of punctures. *Antennae* testaceous; length of scape, funicle and club as 13:7:10; joint 4 of funicle not dilated and longer than 2; the two basal joints of club slightly longer than broad. *Prothorax* transverse (5:8), the sides quite straight; dorsum slightly convex longitudinally, with sparse recumbent white setae and very shallow punctures, which are more distinct in ♂ and often quite obsolete in ♀. *Elytra* rather narrowly ovate, widest a little behind the shoulders; striae comparatively deep, with close distinct punctures; intervals gently convex, smooth, the 8th without any row of granules at the base; the recumbent hairs rather long, white on the pale parts and brown on the darker parts. *Legs* pale testaceous, the femora with two very minute unequal teeth.

Length 2.0-2.5 mm., breadth 0.8-1.1 mm.

KENYA: Kinangop, Aberdare Mountains, 6 ♂, 8 ♀, iii, 1930 (*H. J. Allen Turner*).

Most nearly allied to the South African *N. erraus* Mshl. (Trans. Ent. Soc. Lond., 1927, p. 90, Plate X, Fig. 2), which it closely resembles in pattern, but the shape is more that of *N. balteatus* Mshl. (l.c. Fig. 3).

Subfamily *OMOPHORINAE*.

Omophorus boxi, sp.n., ♂♀ (Figs. 3 and 4).

Derm varying from blackish to blackish brown to red-brown, opaque, evidently during life covered above and below with a whitish waxy efflorescence, but in 2 ♀ this substance is mainly red.

Head obliquely striolate on the vertex, which bears a deep median sulcus, and with sparse recumbent grey hairs; frons with dense round punctures and with a median stria anteriorly (continuous with that on rostrum), which very rarely widens into a median fovea. *Rostrum* much longer than broad (9:5), stout, parallel-sided, with a median sulcus on the basal half; coarsely punctate throughout in ♂, the punctures rugosely confluent laterally on the basal half; apical half in ♀ smooth, opaque, with fine shallow punctures. *Antennae* red-brown; the robust club longer than the 5 jointed funicle (4:3). *Prothorax* subconical, nearly twice as broad as long, widest at base, rapidly narrowing in front, with a broad shallow apical constriction, bisinuate at base, truncate at apex; dorsum sloping steeply forwards, strongly and closely punctate, with a low rounded tubercule on each side of the disk beyond middle and clothed with fine recumbent grey setae. *Scutellum* large, triangular, rugulose, with sparse grey setae. *Elytra* as broad as long, parallel-sided from the prominent shoulders to beyond middle and broadly rounded behind, broadly lobate on each side of the scutellum, and jointly rounded at apex;

dorsum tectiform, being highest along the suture, the dorsal outline very strongly convex, highest not far behind the scutellum, sloping steeply to apex and still more steeply to base; a low obtuse elevation at base of interval 2 adjoining the scutellum and another near base of interval 4, the posterior callus feeble; the shallow striae containing rows of strong separated punctures, stria 10 almost obliterated behind the hind coxae, its outer edge forming a narrow carina throughout. *Legs* red-brown, with rugose shallow punctation and stiff recumbent whitish setae; tibiae straight, with a strong sharp mucro.

Length 4.5-5.0 mm., breadth 3.1-3.5 mm.

KENYA: Kabete, 11 ♂, 8 ♀, iii, 1922 (*H. E. Box*—type); Nairobi, 2 ♂, viii, 1925 (*Dr. V. G. L. van Someren*).

Much smaller than the common *O. stomachosus* Boh., that attacks fig trees, and more nearly allied to *O. indispositus* Boh., from Benguella. The latter has larger tubercules on the pronotum, with a broad depression between them; the elytra are shiny, with much sparser punctures, the elevation behind the scutellum is much higher and stria 10 is complete (Fig. 4).

It may be noted that *O. occidentalis* Fairm., 1902, is a synonym of *O. indispositus* Boh., 1845 (*n.syn.*), and *O. nicodi* Hust., 1924 (Ann. Soc. Linn. Lyon, p. 22—omitted from *Coleopt. Cat.*) is also synonymous with *O. cupreus* Pasc., 1870, which is widely distributed in West Africa (*n.syn.*).

Subfamily *TRYPETINAE*.

Peltostethus, gen.nov.

Form oblong, somewhat flattened. *Head* subconical, frons a little narrower than base of rostrum, eyes flat. *Rostrum* subcylindrical, almost straight and about as long as the pronotum in male, longer and curved in female; scrobes oblique, rapidly passing beneath base of rostrum, the antennae being inserted well behind middle in both sexes; mandibles decussate and bidentate; mentum very small, resting on a long peduncle. *Antennae* with the scape strongly clavate, reaching the hind margin of the eye; funicle somewhat widening distally; joint 1 longer than 2, 3-7 transverse; club ovate, only slightly wider than the funicle, joint 1 longer than the rest together. *Prothorax* slightly transverse, rounded laterally, truncate at the base and at the gular margin. *Scutellum* small, triangular. *Elytra* oblong, wider at the shoulders than the prothorax. *Legs* with the femora very strongly clavate, compressed, with a stout tooth; tibiae straight, narrowing distally, strongly uncinate and with a small mucro; tarsi not spongy beneath, but each joint fringed distally with stout setae, joint 3 with rather narrow divergent lobes, the claws free and simple. *Sternum* with the intercoxal piece of the prosternum nearly half as wide as that of the mesosternum (5:9); the prosternum in front of the coxae not longer than a coxa, the

postcoxal area forming a sharply marginate transverse hexagon with vertical sides; mesosternum with the intercoxal area wider than a coxa (3:2); metasternum with the median area quite flat and its lateral margins subangulate and with a median stria on its posterior two-thirds, the episterna broad and dilated behind, the hind coxae separated from the elytra not only by the episterna but also by a piece of the metasternum. *Venter* with the intercoxal process ogival, wider than a coxa; ventrite 2 as long as 1 behind the coxa and separated from it by a fine arcuate stria, 3+4 about half as long as 2.

Genotype: *Peltostethus gedyei*, sp.n.

Only one genus of this subfamily has previously been described from Continental Africa, viz., *Homoeopus* Berg (*Isopus*, Fst., 1898), from the Cameroons, which differs from *Peltostethus* in having the prosternal intercoxal process much narrower (only as wide as the apex of the scape), and the intercoxal process of the venter narrower than a coxa; the femora also are unarmed, and the prosternum lacks the sharply defined hexagonal area behind the front coxae.

The three genera described by Champion (1914) from the Seychelles also all lack the prosternal hexagon, the femora are unarmed, the front coxae are as widely separated as the mid coxae, the antennae are inserted at or beyond the middle of the rostrum, the tibiae bear an uncus but no mucro, etc.

Peltostethus gedyei, sp.n., ♂♀ (Fig. 5).

Derm uniformly red-brown, rather opaque, with recumbent scale-like setae.

Head with dense rugose punctation and a shallow median frontal fovea. *Rostrum* of ♂ almost straight, with coarse confluent punctation behind the antennae and finer separated punctures distally; rostrum of ♀ longer, curved, with close shallow punctures near to the base only, shiny and impunctate beyond. *Prothorax* slightly broader than long, strongly rounded laterally, widest somewhat behind the middle, narrowly constricted at apex, the constriction continued across the dorsum, truncate at base and apex, the former nearly twice as wide; dorsum flattened on the disk, with rather large close ocellated punctures and sparse recumbent clavate pale brown setae. *Scutellum* bare, coarsely punctate in the middle. *Elytra* wider at the shoulders than the prothorax, parallel for three-fourths their length, rather broadly rounded behind, jointly rounded at apex; dorsum rather flat on the disk, the striae deep and with shallow punctures, the intervals broader than the striae, flat and transversely rugose, with a single row of closely placed recumbent scale-like setae of a pale brownish colour. *Legs* rugosely punctate, with similar but narrower setae. *Venter* of ♂ with a broad shallow median impression on the two basal ventrites.

Length 4.5-5.0 mm., breadth 2 mm.

KENYA: Rabai, 2 ♂, 4 ♀, i-ii, 1929 (*A. F. J. Gedye*).

This interesting addition to the East African fauna will probably prove to be associated with palm trees.

Subfamily *ITHYPORINAE.*

Haplocorynus deceptor, sp.n., ♂♀.

Derm black, with dense ochreous brown scaling; pronotum more or less bare in the middle; elytra with a large subovate lateral black patch between striae 4 and 9, which has a more or less complete narrow border of creamy scales on its upper edge, and a very faint small paler Λ-shaped mark on the suture behind the middle; underside with dense uniform pale brown scaling.

Head with rather large reticulate punctures, with broad scales laterally and narrow ones in the middle. *Rostrum* deeply constricted at base, a little longer than the pronotum; strongly and closely punctate on basal half in ♂, without any median carina, very finely and sparsely punctate distally; basal punctures much less coarse and more restricted in ♀, distal part almost impunctate. Antennae red-brown, inserted at about middle (♂) or slightly behind it (♀); funicle with joint 2 a little longer than 1, 5-7 moniliform. *Prothorax* as broad as long, rounded laterally, widest behind the middle, not constricted apically, the very shallowly bisinuate base much broader than the arcuate apex; dorsum convex longitudinally, highest behind the middle, with large subreticulate punctures (mostly concealed by scaling) and a strong median carina on the anterior half or two-thirds; scales much larger than those on the elytra, broad and dense laterally, much narrower and not concealing the derm in the middle of the disk. *Scutellum* subquadrate, with dense erect cream-coloured scales. *Elytra* oblong-ovate, the shallow striae containing large separated punctures, each containing a large pale scale; the intervals convex, of equal height, each with a row of round shiny granules bearing a broad subrecumbent seta. *Legs* with dense ochreous scaling, moderately long, the hind femora shortly exceeding the elytra; femora with an indistinct dark spot at the base of the clavate part, the hind femora with another much larger patch on the basal half, the tibiae with a broad dark ring near base; hind femora strongly clavate, compressed but not very broad in the basal half, the strong squamose tooth with the distal margin simple and sinuate; hind tibiae bisinuate on the inner edge, the outer apical angle obliquely rounded. *Sternum* with the mesosternal process narrowed from base to apex, the latter narrowly truncate and not elevated. *Pygidium* of male broadly excavate and very rugose at apex.

Length 8.5-9.5 mm., breadth 3.2-3.8 mm.

UGANDA: Mawakota, 5 ♂, 8 ♀, ix, 1931 (*Dr. V. G. L. van Someren*).

Superficially very similar to *H. nigrolateralis* Mshl., 1935, from the Rhodesias and Nyasaland, but the latter species differs strikingly in the structure of the mesosternal process which at its apex is dilated into a broad elevated concave ridge. It presents also the following differences: the rostrum is much more strongly punctate throughout; the pronotum has a much finer lower median carina, and the spaces between the punctures are narrower; the hind femora scarcely reach the apex of the elytra; the hind tibiae are angulate externally at the apex and the inner edge is sinuate only on the basal half.

A COLLECTION OF RHOPALOCERA FROM KAKAMEGA.

By R. Tenniel Evans,

Kisumu.

Introduction.

I have recently had the opportunity of looking over and classifying a collection of butterflies made in Kakamega (Kakamega Forest, about ten miles from Kaimosi, on the right bank of the Yala River) from 1935, to 1938. This collection was made by Mr. M. E. Collier, and was made, not with any scientific purpose, but purely as a means of passing spare time. The collector is not a naturalist, and therefore, as is to be expected, there are certain gaps, particularly in the female sex of the species collected. I have, however, decided to review the collection here, as, in spite of the gaps, it does give a very good idea of the species of butterflies to be expected in the Kakamega area. As might be expected in an "amateur" collection such as this, the more showy species, such as *Charaxes* and *Papilio*, predominate, and the smaller species, particularly those of *Lycaenidae* and *Hesperiidae*, are poorly represented. The collection consists of 959 specimens, and includes all the families, many of the sub-families, 57 genera and 135 species. Of these, there are seven species which I have been unable to identify, owing to lack of literature and comparative material to aid me in my identification. The female sex is poorly represented throughout the collection, with the exception of one or two species. In this connection, it must be remembered that, unless one knows the habits of the different species, one seldom sees female butterflies. Female *Charaxes*, in particular, are far from common. They are not attracted to the smelly baits beloved of the males of the genus, and, in fact, one seldom sees them except flying in undergrowth in search of their food-plants, or, occasionally, flying high and fast with a male in pursuit. It will be noticed that *Charaxes* is represented here by males alone.

Systematic List.

Family *DANAIDAE*.

Danaus chrysippus (L.).

Seventeen males and three females. Of these, sixteen males and the females are of the form *chrysippus* L. The other male is of the form *alcippus* Cr.

Danaus (Tirumala) limniace petiverana (Dbl.).
Ten males and two females.

Danaus (Melinda) formosa (Gdt.).
Eleven males.

Danaus (Melinda) formosa mercedonia (Karsch.).
Five males.
Some of the *M. formosa formosa* show a darkening of the orange base of the forewing, apparently transitional to the race *mercedonia*. These two races intergrade in this area.

Amauris damocles f. *psyttalea* Plotz.
Thirteen males.

Amauris hecate (Butl.).
One male.

Amauris oscarus Thurau.
Two males.

Amauris echeria jacksoni Sharpe.
Fifteen males.

Amauris albimaculata Butl.
Four males.

Family *ACRAEIDAE*.

Acraea admatha leucographa Ribbe.
Two males and six females.

Acraea zetes f. *menippe* Drury.
Eight males and four females.

Acraea egina egina Cr.
Four males.

Acraea natalica abadima Ribbe.
One male.

Acraea asboloplintha Karsch.
Eleven males and two females.

Acraea bonasia alicia Sharpe.
Two males.

Acraea sotikensis Sharpe.
One male and one female.

Acraea pharsalus Ward.
Two males.

Acraea penelope Staud.
Three males.

Acraea semivitrea Auriv.
Four males.

Acraea quirinalis Gr.-Sm.
One male.

Bematistes (Planema) poggei nelsoni Smith & Kirby.
One male.

Family *NYMPHALIDAE.*

Euxanthe crossleyi ansorgei Rothsch.
Eight males.

Charaxes fulvescens.
Twenty-four males.
This species is represented here by what appear to be two races. The predominant race is *Ch. f. monitor* Rothsch, of which there are twenty specimens. The remaining four are of a race which was described by van Someren in "The Butterflies of Kenya and Uganda," Vol. I, Part VII, p. 133, figured on Plate LII. He refrained at the time from applying any name to it, as it was not possible to obtain comparative material necessary for a proper identification. It has since been named *stonehami* Jeffrey, Bull. Stoneham Museum, No. 4, Sept., 1931. The points of difference are: *monitor.* Forewing not acuminate and f.w. border forming practically a straight line. H.w. border regular, not indented, with a broad spatulate "tail" on vein 4. Submarginal f.w. spots. distinct. *stonehami.* Forewing markedly acuminate, and marginal border concave. H.w. border deeply indented between the veins, and the "tail" on vein 4 slenderer than in *monitor.* Submarginal f.w. spots indistinct, but general colour, both above and below, richer than in *monitor.*

Charaxes candiope (Godt.).
Thirty-nine males.

Charaxes cynthia Butlr.
One male.

Charaxes castor Cram.
Twelve males. Ten of these are of the form *godarti* R. & J., with the ground colour of the base of the forewing underside black, not chestnut (in my experience, the predominant form in this area). The remaining two seem to be transitional to the typical form *castor* Cram., in that the ground colour of this area of the forewing underside, though very dark, shows a definite tendency towards chestnut.

Charaxes pollux Cram.
Six males.

Charaxes brutus Cram.
Two males.

Charaxes numenes Hew.
Three males.

Charaxes bipunctatus Rothsch.
Twenty-four males.

Charaxes tiridates Cram.
Nine males.

Charaxes pythodorus Hew.
Thirty-eight males.

Charaxes eupale dilutus Rothsch.
Twelve males.

Charaxes subornatus minor Joic. & Talb.
One male.

Charaxes lichas bebra Rothsch.
Sixteen males.

Charaxes paphianus subpalida Joic. & Talb.
Two males.

Charaxes etesipe Godt.
Eight males.

Charaxes anticlea adusta Rothsch.
One male.

Charaxes etheocles s.l.
Twenty males of form *violacea* and three males of form *lutacea*.

Euphaedra uganda kakamegae van Som.
Three males and four females.

Euphaedra eleus alternus van Som.
One male, f. *coprates*, and one female

Aterica galene Brown.
Two males.

Euryphene sophus audeoudi Riley.
Eight males and eleven females.

Cymothoe sangaris hobarti Btlr.
Eleven males and two females

Cymothoe lurida butleri Grunb.
Seven males.

Cymothoe herminia johnstoni Btlr.
One male.

Euptera elabontas Hew.
One male.

Catuna crithea Drury.
Ten males and four females.

Pseudacraea lucretia Cr.
Three males.

Hypolimnas missippus (L.).
Nine males and two females, f. *inaria*.

Hypolimnas dinarcha Hew.
Three males.

Hypolimnas anthedon Dbl.
One male.

Hypolimnas dubia mima Trim.
One male.

Salamis parhassus aethiops Pal.
Sixteen males and one female

Salamis temora Fldr.
Fourteen males and one female.

Precis stygia Auriv.
Twenty-four males.

Precis pelasgis Godt.
Two males.

Precis milonia Fldr.
One male.

Precis westermanni Westw.
Sixteen males.

Precis sophia albida Suff.
Two males.

Precis octavia f. *natalensis* Stgr.
Two males.

Precis cebrene Trim.
One male.

Precis clelia Cr.
Twelve males and two females.

Catacroptera cloanthe Cr.
One male and one female.

Kallima ansorgei Rothsch.
One male.

Vanessa cardui (L.).
Three males.

Atella phalantha Drury.
Nine males and one female.

Lachnoptera ayresi Trimen.
Six males and 2 females.

Vanessula milca Hew.
Four males.

Atanartia delius Drury.
Three males.

Atanartia schoenia Trim.
One male.

Cyrestis camillus F.
Twenty-two males.

Crenis boisduvalii Wlngr.
Two males.

Crenis trimeni Auriv.
Two males.

Neptis saclava marpessa Hppfr.
Five males.

Neptis agatha Stoll.
One male.

Neptis nysiades Hew.
Two males.

Neptis melicerta Drury.
One male.

Neptis metella Dbl. & Hew.
One male.

Neptis woodwardi Sharpe.
One male.

Ergolis pagenstecheri Suff.
Two males.

Eurytela dryope angulata Auriv.
One male.

Eurytela hiarbas Drury.
One male.

Family *SATYRIDAE*.

Melanitis leda (L.).
One female.

Gnophodes parmeno Dbl. & Hew.
One male.

Neocoenyra gregorii Btlr.
One male.

Ypthima albida Btlr.
One male.

Mycalesis ignobilis Btlr.
Two males.

Mycalesis anynana Btlr.
One male.

Mycalesis dubia Auriv.
One male.

Mycalesis sp.
Six males and four females.
This is a species I have been unable to identify. It is not unlike *M. miriam* F., but a very much darker and richer brown.

Family *LIBYTHAEIDAE*.

Libythaea labdaca Ww.
Four males.

Family *RIODINIDAE*.

Abisara rogersi Druce.
One male.

Family *PAPILIONIDAE*.

Papilio dardanus Brown.
Fourteen males and two females, one of the form *hippocoon* F., and one of the form *planemoides* Trim.

Papilio rex.
This species is represented in this area by two races, *rex rex* Oberth., the eastern race, and the western race, *rex mimeticus* Rothsch. Here we have two males and one female of the race *rex*, one male of the race *mimeticus*, and one male which appears to be an intermediate. Total, four males and one female.

Papilio bromius chrapkowskii Suff.
Thirty-six males and six females.

Papilio nireus lyaeus Dbl.
One male.

Papilio mackinnoni Sharpe.
Eighteen males.

Papilio homeyeri Plotz.
Five males.

Papilio demodocus Esp.
Eleven males and two females

Papilio menestheus lormieri Dist.
Twenty-two males.

Papilio phorcas Cr.
Thirty-nine males and one female.

Papilio pylades angolanus Goeze.
One female.

Papilio leonidas F.
One male.

Papilio policines Cr.
Eight males.

Family *PIERIDAE*.

Belenois picta Neave.
Twelve males and one female.

Belenois raffrayi (Oberth.).
Six males.

Anapheis severina Cr.
Ten males.

Anapheis aurota (Fab.).
Four males and three females.

Anapheis gidica abyssinica (Luc.).
Two males and two females.

Appias epaphia (Cr.).
One male.

Catopsilia florella (F.).
Ten males and nine females.

Terias desjardinsi (Bsd.).
Fifteen males and one female.

Terias brigitta zoe Hoppf.
One female.

Terias floricola ceres Btlr.
One male and one female.

Leuceronia argia F.
Nine males.

Leuceronia thallasina Bsd.
Nineteen males and one female.

Dixeia pigea (Bsd.).
One male.

Mylothris yeuli Btlr.
Three males.

Mylothris poppaea Cr.
Four males.

Leptosia medusa Cr.
Four males.

In addition to the above *PIERIDAE,* there is one unidentified species. This is superficially like an *Eronia,* but built more on the lines of a large *Leptosia.* It is a male.

Family *LYCAENIDAE.*

Uranothauma falkensteini Dew.
Four males.

Hypolycaena antifaunus Dbl. & Hew.
One male.

Syntarucus telicanus Lang.
Five males.

Lycaenesthes sp.
One male. A very pale mauve species.

Lycaenesthes sp.
Three males.

Azanas jesous Guér.
Three males.

Family *HESPERIIDAE.*

Celaenorrhinus galenus intermixtus Auriv
Four males.

Eretis lugens (Rog.).
One male.

Ceratrichia flava Hew.
Two males.

Coeliades sp.
Two males.

Coeliades sp.
One male.
One male of an unidentified Hesperid.

From a perusal of the above systematic list, it will be noticed that there are several notable absentees, particularly among the genera *Acraea, Charaxes* and *Euphaedra.* That extremely plentiful *Euphaedra* in other parts of Western Kenya, *E. medon fraudata* Thurau, is not represented at all, and the entire genus is represented only by nine specimens. As a matter of fact, this agrees with my own experience in the same forest, where I found *Euphaedra* to be extremely uncommon, especially when compared with the Kabras Forest, some 20 miles away, and the Isioha River, about half that distance away, where, at certain times, *Euphaedra* literally carpeted the ground, particularly in the vicinity of trees the fruit of which were falling. More striking than the absentees, however, are the rarities. *Charaxes numenes* Hew., for instance. This is usually an extremely abundant species, yet here it is represented by only three specimens. *Ch. cynthia* Btlr., again, a very common species, is represented by only one male. On the other hand, a butterfly usually considered rare, *Ch. pythodorus* Hew., is represented by as many as 38 specimens. (In parentheses, I would like to point out that my own experience of this species is that it is far from rare.) I am of opinion that a careful study of the butterfly populations of the various forests in the Kakamega area would be extremely valuable.

Evidence of Attacks on Specimens by Birds, Etc.

In the collection are thirteen specimens which bear evidence, in the form of cuts in the wings, of attacks by birds or lizards. Most of these (ten specimens) are *Charaxes,* and of these *Charaxes,* all but one, a male of *Ch. fulvescens monitor,* are among the more powerful species of the genus. The remaining

three specimens are a female of *Euphaedra eleus alternus,* a male of *Salamis temora,* and a male of *Papilio policines.*

The damage caused is as follows:—

Ch. f. monitor. A V-shaped nick, symmetrical in each wing, out of each hindwing at the anal angle, showing a probable attack from the rear while the insect was sitting with closed wings.

Ch. candiope. The anal angle and most of the inner margin of the left hindwing removed, showing what was probably an attack while the insect was in flight.

Ch. castor. A small V-shaped nick out of each hindwing at vein 2, showing a probable attack from behind while sitting with wings closed.

Ch. tiridates. (Three specimens.) One has a large portion of the left hindwing from the anal angle to vein 7, and level with the apex of the cell, cleanly removed, as well as a nick at the anal angle of the right hindwing. Probably an attack from the side whilst in flight. Another appears to have been attacked twice. Half of the right hindwing, in a straight line from the tip of vein 2 to about ⅓ of the way up the costa, has been cleanly removed, together with a large portion of the right forewing. This looks like an attack from the rear, either whilst in flight or while sitting with wings open. The other attack cost the insect the tips of both forewings, and was obviously made whilst sitting with closed wings. The third specimen has a large V-shaped nick out of each hindwing, that on the left extending nearly to vein 4, while the nick on the right does not extend beyond vein 3. The nick on each wing reaches to the apex of the cell. This attack appears to have been made from behind while the insect was sitting with closed wings.

A male of *Ch. bipunctatus* appears to have been attacked, but not seriously. The extreme tip of the left forewing has been removed.

Ch. pythodorus. (Three males.) One has the anal angle of both hindwings removed in what was evidently an attack from the rear whilst sitting with closed wings. A second has a large portion of the left hindwing, from the anal angle to vein 4, removed, as well as a portion of the right hindwing, from the anal angle to vein 2. The third has had a large portion of the right hindwing removed. This damage extends into the wing to a point just distal to the base of vein 2, and reaches from the anal angle to vein 4. It looks like an attack from the rear while the insect was either in flight or sitting with wings open.

Euphaedra eleus alternus, female, has a deep cut, 15 mm. wide, in the left forewing from vein 2-7, and a cut in a straight line with this in the left hindwing from the costa

to vein 4. There is a deep U-shaped nick on the right forewing, the forward edge of which corresponds with the forward edge of the cut on the left forewing. It is difficult to judge how this attack was made.

A male of *Salamis temora* has a cut in each hindwing from the anal angle to vein 4.

A male of *Papilio policines* has the distal half of both hindwings, as well as a portion of the left forewing outer margin, from the hind angle to vein 5, removed. The cut in the forewing forms a straight line with that in the hindwing. The damage indicates an attack, probably from above, while the insect was sitting with closed wings. It is no uncommon sight to see this species bearing damage similar to this.

It will be noticed that all these specimens bear damage apparently due to attack more or less from behind, and, in fact, one seldom, if ever, sees a specimen bearing traces of attack from any other quarter. This may be due to the fact that an attack from the front damages the forewing costa, incapacitating the insect, which consequently does not survive; but I am of opinion that birds and lizards tend to attack from the rear rather than from the front, as, from that angle, they are less likely to be spotted by their prey than in a frontal attack. Field observations made by other observers bear out this theory, and, in any case, the natural direction from which to stalk anything, from a butterfly to an elephant, is that which is most likely to be the prey's "blind side," from behind in the case of those creatures which rely on keen eyesight, and from down-wind in the case of those whose sense of smell is their chief safeguard. The fact that a butterfly is less vulnerable from the rear is, in my opinion, a minor consideration. I say it is less vulnerable because, although it is likely to lose a goodly portion of one or both hindwings, this is not a very serious injury, and affects the power of flight hardly at all. In fact, I have seen butterflies with hardly any hindwings remaining, and apparently just as agile as a perfect specimen. Damage to the forewing costa, on the other hand, is apt seriously to cripple the insect, and if close to the body, to render flight an impossibility. The danger of an insect receiving this type of damage, however, is offset to a great degree by the fact that the insect can see its assailant, and is able to make good its escape before the attack develops. The specimens in this collection which bear damage obviously caused by birds or lizards tend to support this theory, as all, with the exception of two which have lost the tips of the forewings in an attack which might have been either from front or rear, bear injuries which point to attack from behind, most of the damage being to the hindwings, or the hinder edge of the forewings.

A CURIOUS VARIETY OF *CHARAXES PYTHODORUS*, FEMALE.

By R. Tenniel Evans,

Kisumu.

In his paper on *Charaxes,* published in the *Journal of the East Africa Natural History Society,* (Butterflies of Kenya and Uganda, **1**, Part VIII), Dr. van Someren makes mention of two races of *Ch. pythodorus, Ch. p. pythodorus* Hew., from Uganda, Kakamega, and Elgon, and *Ch. p. nesaea,* G.-Smth., from the coastal districts of Kenya. He describes the difference of *nesaea* from *pythodorus* as being the smaller size, discal blue bar more tinged with purplish, and underside richer yellow.

I have before me a specimen of *pythodorus* bred by me in February, 1933, in the Kama Koiwa district of the Trans-Nzoia, food-plant *Craibia brownii* Dunn. It is a female (when van Someren wrote his paper the females of both races were unknown, and as far as I am aware, the female of *nesaea* still is). It is only just over half the size of a normal female of the typical race, but may be an undersized specimen (it was bred from a nearly mature found larva). The chief points of difference lie in the coloration of both upper and under surfaces. The discal blue bar is distinctly purplish in colour, while the submarginal series of blue spots in the forewing are considerably larger than in typical *pythodorus* female. The submarginal spots in the hindwing are more distinct, especially at the anal angle, and are much whiter, less tinged with blue.

On the undersurface, again, is a difference. The whole ground-colour is richer, and the black lines and spots are more clearly defined than in typical *pythodorus.* In particular, the post-discal series of indistinct brown spots in the hindwing are deeper in colour, and much browner, as is the submarginal series of brown spots in the forewing. There is less greyish-purple about the "eye"-spot at the hind angle of the forewing, while the "U"-shaped mark in area 1 of the forewing is reduced to a large, irregular, black spot. The white spots in areas 2, 3, 4 & 5 of the forewing show through much more distinctly owing to the richer ground-colour.

The entire appearance of the specimen agrees far more with the description of *nesaea* from Teita and Taveta, than with that of *pythodorus* from the area in which this specimen was obtained. I have seen no other specimen of *pythodorus* (and many have passed through my hands), either male or female, which

approaches this in richness of coloration. This specimen is now in the collection of butterflies in the Coryndon Memorial Museum, Nairobi.

It would be interesting to discover if any link exists between the two races of *pythodorus*, at present separated by several hundred miles of highly diversified country. As far as my information goes, *nesaea* is rare. *Pythodorus,* on the other hand, though spoken of in van Someren's paper referred to above as uncommon, is, in my experience, fairly common where it occurs—in fact, in Kakamega, I found it to be one of the commonest *Charaxes*. It is of interest to note, with regard to the specimen described above, that Rothschild and Jordan place *pythodorus* from the Uganda-Kitale area as belonging to the race *nesaea*—a placing with which van Someren disagrees (see *Journal of the East Africa Natural History Society,* **12,** Nos. 5 & 6, January-April, 1935, page 187).

A HISTORY OF THE POKOMO BY MIKAEL SAMSON.
—*Continued.*

WITH AN INTRODUCTION AND NOTES BY

R. G. DARROCH.

INTRODUCTION.

The accompanying "History of the Pokomo" by Mikael Samson, a Pokomo of the Buu tribe, employed as a clerk in the District Commissioner's Office, Kipini, is a continuation of his "History of the Malachini," which has already been published. He gave it to me when I was already under orders for transfer from Kipini. The translation and preparation of notes had, therefore, to be done very hurriedly, and I was able to give far less time than I would have liked to clearing up doubtful points.

"History" is, perhaps, not the best title for his work, but I cannot think of a better, and it is the one he uses himself. It is admittedly scrappy, and makes no real pretence at chronology. Precedence is naturally claimed by several tribes, and no one can say for certain which is the better claim, but Mikael's opinions are on the face of things reasonable, except in the case of the Kalindi claim to land near Kipini. They may have been there before the Arabs came, but were definitely inferior to them, and Arabs held much land in the Ten-Mile Strip, which have been recognised as freehold plots. It is only fair to add that a good many such Pokomo claims were also recognised in the early days of British rule, i.e., the Pokomo were not slaves, though they did pay tribute to the Arabs.

For all that I feel that the spontaneous work of a Pokomo is interesting *per se,* and should be preserved lest old traditions be lost. As it and the notes I have ventured to append show, these traditions are already confused.

A striking feature is that though all Pokomo now speak a Bantu language, none of the Upper Pokomo clans show a Bantu origin, except perhaps some of those admittedly descended from slaves who escaped from the Oromo. All the rest are Hamitic by their own account. The Malachini mostly show a coastal origin, and claim relationship with the Giriama. Curiously enough the Gwano told me that the Malalulu were of Giriama origin, but this is not corroborated, and the Malalulu being the most northerly of the Pokomo and the last to reach the Tana, are the least likely to have a coastal origin. Pokomo is a Bantu language with admittedly many Hamitic words. How then did Sango and Ana understand each other? Possibly Sango under-

stood Oromo since he would probably have been in contact with Oromo or Wata before reaching the river. I asked many elders how long ago they gave up speaking Oromo. The Ndera thought it at least three generations before the oldest men still alive: none of the rest would hazard a guess. Many Pokomo are, of course, bi-lingual (some know Somali also), but that is beside the point.

Another interesting thing in comparing the Malachini and Upper Pokomo is that all admit that till some of the Upper Pokomo moved to Malachini country, the Malachini did not know how to make canoes. Some do not even now. As they live in the area of the greatest floods, they must have had a very poor time in the long rains, and by all accounts the Tana contained far more water in days gone by than it does now.

A word is necessary about the map. Mikael's map was over four feet long, and so unsuitable for reproduction. It was also even more out of scale than I fear the one I have prepared is. In scaling it down I was forced to omit much detail, but hope enough is left to help a reader to follow the story.

I would add that several of the inter-tribal boundary disputes which he mentions are by no means finished. I have not commented because they seem to me to be of purely local interest. I wish this work had been available when I first came to Kipini in 1940, because it does throw light on the background, though in some cases Mikael only tells one side of the story.

I have ventured to add some notes both of my own conclusions, and of things which had come to my notice and not to Mikael's. I hope they may be of interest, and not spoil the effect of what is his work and not mine. He started on this years ago completely of his own accord. When he gave me his "History of the Malachini" I encouraged him to go on and do something on the Upper Pokomo as well. His work in the district involves some travelling, so he has had the opportunity to question elders in every location.

As before I have referred to non-Pokomo tribes by the name by which they call themselves, e.g., Oromo, not Galla, Wata, not Boni, Elwana not Malakote, and Munyo, not Korokoro.

The Story of the Kalindi.

When I first wrote the story of the Kalindi, I gave the account as told by the Buu elders, but now I tell what the Kalindi say themselves. They believe that originally they came from Arabia. Then they lived near Pate in Lamu district. Thence they ran away westwards to escape from war and dwelt for a long time at Mungini (Mundini). War began again and they crossed the

sea to Lamu under a chief called Hidabo. There is a hill(1) south of Lamu, which Hidabo called by his own name to be a remembrance of himself. This hill is called Hidabo to this day.

Then they crossed the sea again to the west and followed the shore till they came to Shaka near Kipini. They found no one at Shaka, and they built a town, and worshipped and prayed to God to bless their town and keep war far from it.

There are two Kalindi clans. The Namboo first moved to Shaka while others stayed at Hidabo. Then the Mangwe (or Gomeni) followed them to Shaka and lived there. Possibly some stayed at Hidabo. The old men do not know if there was then a town on the present site of Lamu or not.

When they had lived for a long time at Shaka some strangers came, whose chief was Liongo Fumo. He asked the Kalindi to let him settle among them as allies. The Kalindi agreed.(2) Then he asked for a place beyond Shaka, and the Kalindi gave him land and he built the town of Ozi. Some of his people lived at Ozi, and the Kalindi and Ozi lived together for a long time, and Shaka prospered.

After some time Liongo wanted to buy land.(3) The Kalindi refused saying they would live together as friends, but would not sell land. In truth Shaka belongs to the Kalindi; and the Ozo Swahilis, who now mostly live at Kau, are the descendants of Liongo's people who later built Ozi.

The Kalindi also say that their neighbours upstream were the Yunda, and that they marched with them at Mahindini (near Kibusu). When the first European came to Golbanti he asked where the boundary between the Kalindi and the Yunda was, and two men called Chama and Abanyata took him to Mahindini, and he buried a bottle there. Later another European came to Oda and asked where the bottle had been buried. He was taken there, and he dug up the bottle and buried another.

The Kalindi Land.

After leaving Shaka the Kalindi lived in Chara. At that time Chara was excellent land near the sea, and in the rains fresh water flooded the borders of the river. The soil yielded fine crops for many years. The Kalindi killed hippo and grew rice. Each year they reaped twice, but the land was very wet and mosquitoes increased, so the Kalindi decreased. Even now they are not numerous.

Buu and Upper Pokomo.

When their river died on them, the Buu came down to the Kalindi country and built the town of Ngao. They spread downstream seeking cultivation; their last town was Kikomo above Anasa.

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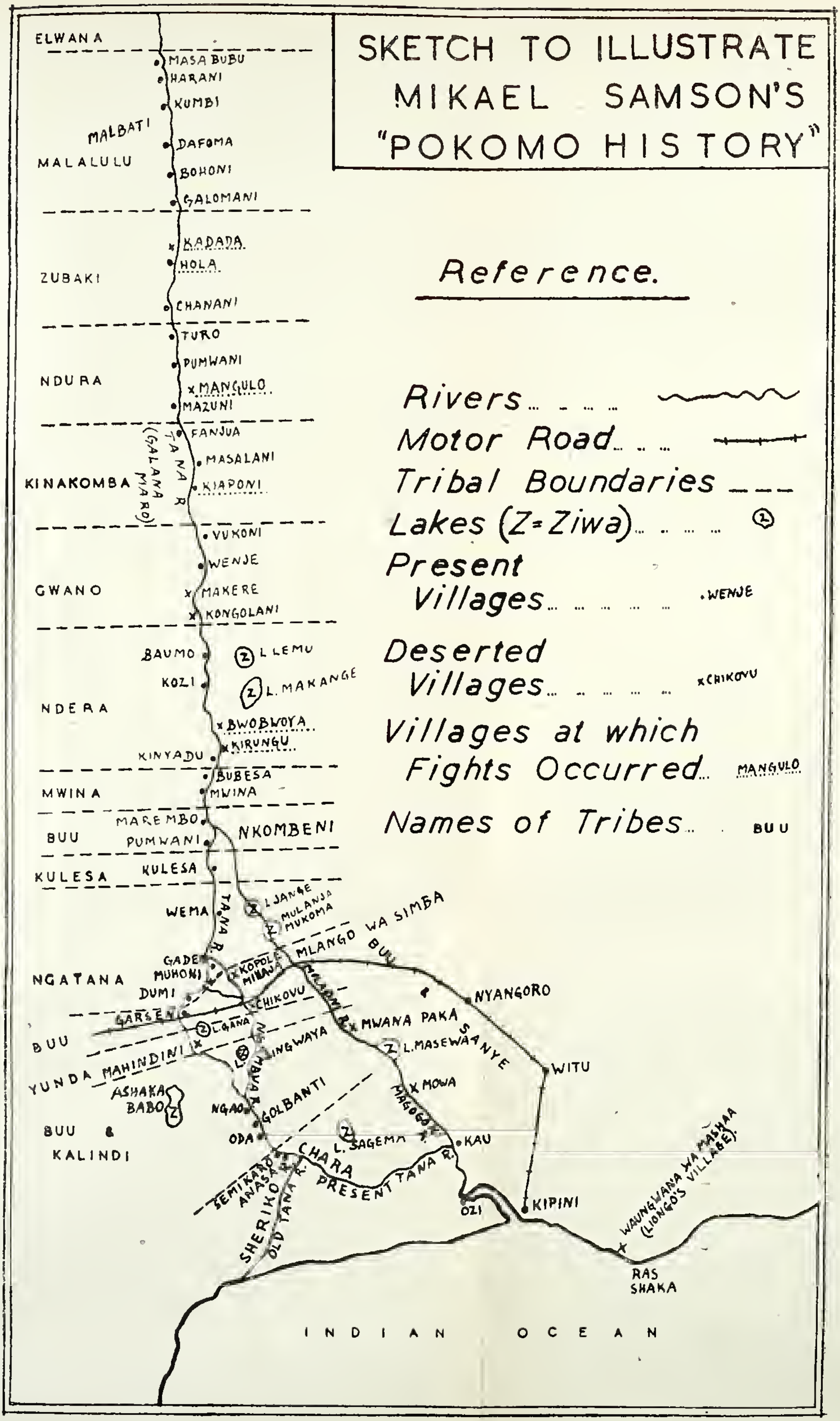
(1) The numbers refer to Notes beginning on page 391.


SKETCH TO ILLUSTRATE MIKAEL SAMSON'S "POKOMO HISTORY"
Reference.
Rivers
Motor Road
Tribal Boundaries
Lakes (Z=Ziwa)
Present Villages
WENJE
Deserted Villages
CHIKOVU
Villages at which Fights Occurred
MANGULO
Names of Tribes
BUU
ELWANA
MASA BUBU
HARANI
KUMBI
MALBATI
MALALULU
DAFOMA
BOHONI
GALOMANI
KADADA
HOLA
ZUBAKI
CHANANI
TURO
PUMWANI
NDURA
MANGULO
MAZUNI
FANJUA
TANA R. (GALANA MARO)
MASALANI
KINAKOMBA
KIAPONI
VUKONI
WENJE
GWANO
MAKERE
KONGOLANI
BAUMO
L. LEMU
KOZI
L. MAKANGE
NDERA
BWOBWOYA
KIRUNGU
KINYADU
BUBESA
MWINA
MWINA
MAREMBO
BUU
PUMWANI
NKOMBENI
KULESA
KULESA
WEMA
TANA R.
L. JANGE
MULANJA MUKOMA
MLANGO WA SIMBA
BUU
GADE
MUHONI
KOPOLO MINAJ
NGATANA
DUMI
CHIKOVU
NYANGORO
GARSEN
L. GANA
MWANA PAKA
BUU
SANYE
L. MASEWA
INGWAYA
MAHINDINI
YUNDA
WITU
MOWA
ASHAKA BABO
NGAO
GOLBANTI
MAGOGO
BUU & KALINDI
ODA
L. SAGEMA
KAU
CHARA
PRESENT TANA R.
SEMIKARO
ANASA
SHERIKO
OLD TANA R.
OZI
KIPINI
WAUNGWANA WA MASHAA (LIONGO'S VILLAGE)
RAS SHAKA
INDIAN OCEAN

Later Upper Pokomo ran away from the Somalis, and seeing the Kalindi country to be empty, settled in Chara. Of all the Upper Pokomo tribes the Ndera were the most to come there, and they are in Chara today.

When Government began to appoint Headmen, no Headman's stave was issued in Chara,(4) because most of its inhabitants were strangers. Most of the Kalindi were in Ngao location with the Buu. The present Headman of Chara, Abdalla Bashora, is the second to be given a stave. The Headman of Chara ought really to be a Kalindi. The Kalindi claim that all land from Shaka to Mahindini is theirs.

EXPLANATION OF THE MAP OF MALACHINI COUNTRY.

I decided to make a map to help a reader to understand what I had written about the Malachini. I did not do the map alone. The school-teacher at Garsen, Johana Daji, who knows the country where the old rivers ran, helped me. So did an old man called Luluta, who lives at Garsen. He lived in the old Buu country himself as a boy. Also many elders have corroborated that this map shows how the country used to be.

On the right of the map you will see a line starting from Nkombeni and running to Kau. That is the river to which the Buu came from the east. It is called Milaoni. Following along it you will see circles with Z inside them. These are lakes (Ziwa). All lakes are marked like this. On the extreme right of the map you will see "Buu and Sanye." This is because the Buu say that when they first came to the river there were no other Pokomo there: their neighbours were the Sanye. This is proved by the fact that to this day if a Sanye kills a beast, especially a hippo, if even only one Buu be there, he must get part of the meat. Similarly if the Buu kill a hippo, even if only one Sanye be there he gets part of the meat, because they share the country.

You will see another line starting at Chahadugu or Koloni. It is called the Ngambwa. The Buu say that when the Milaoni dried up the Ngambwa started, and they moved to it.

Where you see Kopole and Mihaja marked there is a big forest, which the Buu and Ngatana disputed in 1941, before Government. It was decided that the forest belonged to the Buu, and their boundary with the Ngatana was fixed above Kopole.

On this river you will see villages marked with a cross. These are the old Buu and Yunda villages. The principal Buu village was Chikovu.

You will see another river starting near the village of Muhoni, which joins the first river at Mbalahini. This is the Mbewee on which the Buu built the villages of Muhoni, Murikicha, Nyangu, and Gawisa. The Buu lived in them till this river dried up, and then moved to Ngao, where they live to this day. When they lived on the Mbewee their boundary with the Ngatana was at Mbewee.

On the extreme left you will see a river running from Mwina to Kipini. That is the river on which all Pokomo live now.

The interrupted lines show the boundaries of the Malachini tribes from of old to today.

The map is intended to help a reader to understand what I have written, and, if this is made into a book, it will show where our ancestors lived on the old rivers.

The Upper Pokomo: The Ndera.

The Ndera clans are:—	*Oromo Name.*(5)
Kinamoto or Kinamaziwani.	Karayu.
Kinambare.	Karara.
Kinankaru.	Sukana.
Kinauru.	Gamadho.

Kinamaziwani. Three men called Ana Kare, Ana Bake, and Ana Dima,(6) reached the Tana from the East at Kimbu, above Baumo. They were Oromo, and when they reached the Ndera country, they found nobody. Ana Bake crossed to the west bank, and is thought to be the ancestor of the Barareta Oromo. Ana Dima stayed on the east bank and became the ancestor of the Kofira Oromo. Ana Kare lived on the river and became the ancestor of the Kinamaziwani clan of the Ndera.

Kinambare. A man called Maro Diribo of the Kinaghaiba clan of the Ndura came. He was followed by Buya Bula. They are the ancestors of the Kinambare.

Kinankaru. A Malalulu called Dambala Kakea travelled down to Kalindi country. On his way back he stopped in Ndera. He is the ancestor of the Kinankare.

Kinauru. A Malalulu whose name is unknown, killed his brother, and moved to Mwina country. He married and had descendants there. When the Swahilis came and overcame the Mwina, half his descendants moved to Ndera. They are the Kinauru. Those who stayed in Mwina country are now called the Kinahabfa.

Slavery of the Inhabitants of Kinyadu Village.

One Herbae bought a woman called Rehema and married her to a slave called Magombe. They had many children. One Bawata Tutu bought another woman called Kimtovu, and married her to a slave called Hamadi. They also had many children. These four people are the ancestors of the inhabitants of Kinyadu village. They are all Kinauru.

Ndera and Mwina.

The Mwina are the tribes living next below the Ndera. Their boundary used to be at Lake Makange, opposite Kozi village. They gave that lake to a girl called Wamboo. Below that used

to be Mwina country. After some generations the Mwina moved and the part above Bubesa became Ndera country.

Ndera and Gwano.

The Gwano live next above the Ndera. The Ndera say that on the east bank their boundary is Malbe Walu, and on the west Kongolani.

Ndera and Oromo.

From long ago the Oromo were conquerors. They used to go round the villages singing war songs. The Ndera elders used to collect tobacco and all kinds of food to give to them. Then the Oromo would sing songs of victory and go away. Of their own will the Oromo used to give the Ndera a bull or a goat. There was never war between the Ndera and the Oromo.

Ndera and Somalis.

When the Somalis first came to Ndera they gave no trouble, but about 50 years ago they attacked Bwobwoya village. The Ndera resisted and many were killed on both sides. The Ndera were troubled because they had their women and children with them, so they broke their stockade and ran away. The Somalis seized the chance to capture many women and children. Since then there was no war, but from time to time the Somalis killed an Ndera, and occasionally a Somali was killed in the days before Government came.

Ndera and Arabs.(7)

When the Arabs had overcome all the Malachini they wanted to enter the country of the Upper Pokomo also. A party of Arabs came to Kirungu in Ndera and demanded to be taken on by "maro." (*Note.*—This was a system by which the inhabitants of each village had to send canoes free to the next village up or down according to the way the Arabs were travelling.—R.G.D.) The Ndera refused and fought the Arabs and beat them. A Gwano called Buya Gafo was living with the Ndera; he killed the Arab leader. After that the Arabs never attacked the Upper Pokomo. They only came peacefully to trade.

The Gwano.

The Gwano clans are:—	*Oromo Name.*
Kinauru.	Gamado.
Kinadyasi.	Karayu.
Kinakale.	Karara.

Kinauru. Three men called Ana Bake, Ana Dima, and Ana Kare came to the Tana from the East.(6) They reached it at Takafu near Makere. No one knows what their tribe was. After

a time Ana Dima and Ana Kare crossed the river. Ana Kare taking his cattle out to the west, while Ana Dima stayed on the river to cultivate. Ana Bake stayed on the east side; he is thought to be the ancestor of the Kofira Oromo. Ana Kare, who went to the west, is thought to be the ancestor of the Migo Oromo. It is said that this tribe is lost, having gone to Kamba country to escape from other Oromo who came later. Ana Dima, who stayed to cultivate, is the ancestor of the Kinauru, the principal Gwano clan.

Kinadyasi. Their ancestor was Kokane Didha. His mother was a Gwano married to a Zubaki. Her husband died, and she returned to Gwano with her son Kokane.

Kinakale. A man called Dulo was a slave of the Oromo. He escaped and reached the Tana near Wenje. He married and had children. To this day a sept of the Kinakale are called Karara Dulo in memory of this man.

Ana Dima's Journey Downstream.

Ana Dima's canoe was taken by the river. He followed downstream to Lake Lemu, where he met Sango Vere,(8) the ancestor of the Buu. Sango's fire had gone out, so he left the old Buu country to look for fire. Also he had found the canoe, so he thought there must be people upstream. Sango Vere and Ana Dima greeted each other by the name of Abamogo, which means wayfarer, because they did not know each others' names. Even today Malachini and Upper Pokomo greet each other as Abamogo, because of the meeting of Sango and Ana. Then Sango returned downstream, having arranged for Ana to send him some tobacco. Ana made another journey to the old Buu country on the old river running by Koloni. He met no people on the way through Ndera and Mwina country. When he reached Buu he saw his lost canoe, but out of friendship he allowed Sango to keep it. The Buu and Gwano are very friendly to this day.

Ana Dima's Journey Upstream.

Ana Dima travelled upstream, but returned without seeing anyone. On a second journey he met the Zubaki.

Origin of the Ndera.

The Gwano elders say that a man called Ana Abio was the ancestor of the Ndera.(6) They do not know his tribe. He came after the Gwano did. He lived near Lake Lemu, and his descendants were thus called Kinamaziwani.

After him came two slaves a man and a woman, who escaped from the Oromo. Ana Abio found them They married and became numerous. Then Ana freed them and they intermarried with the Kinamaziwani. Their children were called the Kinanato.

They live with the Kinamaziwani to this day. The name of the man was Gashiro, and of the woman Hadiribo. There is a place above Baumo called Hadiribo to this day. It is here they reached the Tana.

The Ndera claim the village of Kimbu to be theirs, but the Gwano were there before them. A Gwano chief was killed by the Oromo there. The shambas at Mtumitu below Kongolani belonged to a Gwano called Koya Gafo. He went to live with the Ndera, but kept his land. That is why Mtumitu is in Ndera country now.

The Gwano also say the Ndera conceal their origin from Gashiro and Hadiribo. In spite of its slave origin the Kinanato clan is held in respect among the Ndera.

Those who know also say that the upper boundary of the Mwina is above Lake Makange at Hombe (or Gagani).

Gwano and Kinakomba.

The Gwano say they have no trouble with the Kinakomba about their boundary. If there is any dispute about shamba boundaries the elders of the two tribes settle it easily.

The Treacherous War of Jilo Bune.(9)

The Gwano grew very numerous and were warlike. The Oromo tried many times, but could not defeat them. They took counsel as to how to defeat the Gwano. They then put medicine in a bull, so that if the Gwano eat its meat they would lose their wits. They then took the bull to the Gwano chief as a present. He told his people not to touch it, but they refused to obey. They slaughtered the bull, divided the meat, and everyone took his portion except the chief, who did not eat any of it. When they knew the bull had been eaten, the Oromo built a stockade of thorns, which no man could get through. They then went to the Gwano and said, "Oh, a wonderful thing has happened. Many birds have settled on our chief. Come and see." Hearing this the Gwano went to see, men, women and children. The Oromo were waiting for them in their stockade, with spears ready. As each arrived they deprived him of his weapons, saying it was not right to enter the stockade armed The Gwano did not suspect the craft of the Oromo, and put down their weapons, and entered the stockade quietly, to see the Oromo chief. As they entered the Oromo killed each one. Those who were still outside did not realise what was happening within, because of the medicine they had eaten in the meat of the bull. Thus they were killed without mercy, men, women and children. Even strangers who happened to be passing, hearing that birds had settled on the chief went to see and were killed too.

All the Gwano were killed that day except the chief and his two wives who had not eaten the meat. He was called Dadho

Moroa. Seeing that he alone remained, he moved and built a new village. God gave him children by both his wives. There are two septs of the Kinauru, the Red and the Black, because one of his wives was red, and the other black. That is why the Gwano tribe is very small. They increased later, but their land is not good for cultivation, so they often move to other locations. Those who go do not return, so their tribe is the smallest of the Upper Pokomo.

The Kinakomba.

The Kinakomba clans are:—	*Oromo Name.*
Kinambolo and Mandoyo.	Karara.
Kinamuyani.	Garjeda.
Kinamulunde.	Uta.
Kinambura.	Wayu.

Kinambolo. A Boran called Ali Gutu came to the Tana from the east. He had two wives with him and reached the river at Mankombe or Dakacha, below Kiaponi. He was the ancestor of the Mandoyo. They are one-half of the Kinambolo. The other half are not descended from Ali Gutu, but all are called Kinambolo.

Kinamuyani. Some of them are descended from a Zubaki of the Kinakaliani clan, called Ware Hamesa. The rest are descended from Gamahara Wachu.

Kinamulunde. I could not find out the name of the ancestor of part of this clan, but the rest are descended from the Mandoyo the original clan.

Kinambura. One of their ancestors was a Boran called Kokane Ware. The rest are descended from the Malalulu.

Ali Gutu made a journey upstream and met Ndura of the Sindo wa Ndura. He also travelled downstream and met the Gwano at Batani, now called Vukoni.

The Ndura.

The Ndura clans are:—	*Oromo Name.*
Sindo wa Ndura.	Karayu.
Kinambare.	Uta.
Kinanato.	Karara.
Kinagasere.	Baretu.
Kinajasi.	Hajeji.
Kinambolo.	Karara.
Kinambura.	Wayole.

Sindo wa Ndura. Their ancestor was an Oromo called Galole Hirimani. He reached the Tana from the west at Sagari, near Pumwani. He was accompanied by Gababa Kitole.

Kinambare. They are descended from an Ndera called Mzuka Wayu.

Kinanato. An Ndera called Omara Oda came and found the Sindo wa Ndura hiding from the Oromo and Wata. He fought them and was victorious, so the original Ndura made him their chief. The present chief Dadho Bahola is of this clan, but now the Ndura do not want to be always ruled by this clan.

Kinagasere. A Zubaki of the Kinagasere clan, called Humacha Jilo, lived at Hara near Chanani. He had a son called Madawa, who moved to Ndura. Half his descendants returned to Zubaki, and half stayed in Ndura. From old times the Kinagasere have always been under the chief of the Kinanato.

Kinajasi. One Ntungulu came from Gwano to his friend Ade Abas in Ndura. Ade was a Kinambare. Ntungulu married and became the ancestor of the Kinajasi.

Kinambolo. A Kinakomba called Wario Gobu lived with his uncle Herbae Bahola, of the Kinanato clan. When Wario grew up his uncle got him a wife, and his descendants are the Kinambolo.

Kinambura. One Herbae Bwoe came from Kinakomba. He was a guest of the Sindo wa Ndura. He married and his descendants are the Kinambura. They are the last of the Ndura clans. Herbae had only recently died when Government came.

Ndura and Somalis.

It is not very long ago since the Somalis first came, when the Ndura were living at Mangulo. They fought the Oromo, who ran away to Mangulo, and advised the Ndura to escape, but the Ndura would not listen, because they were holding an Ngaji feast. Next morning Somalis attacked all their villages on the east bank, and killed or captured many Ndura.

The Ndura built a new village near Mazuni. The Somalis came and offered friendship. They persuaded the Ndura to become Mohammedans. The Ndura agreed, but on the day appointed for their conversion the Somalis attacked them, and killed or captured many of them.

Boundaries.

The Ndura say they have never had any trouble with the Zubaki, except small disputes about shamba boundaries, which are easily settled. They have often quarrelled with their Kinakomba neighbours, right up to the present day. The people of the last Kinakomba village, Fanjua, are at enmity with those of the last Ndura village, Mazuni. On one occasion the people of Fanjua beat up those of Mazuni. Hearing of this the Ndura gathered their men, and met the Kinakomba below Mazuni. They fought with fists and clubs, but not with weapons, till the Christian teacher Ibrahim Kitere came and pacified them. The Kinakomba had the worst of it that day.

The Zubaki.

The Zubaki clans are:—	*Oromo Name.*
Uta.	Uta.
Ilani.	Ilani.
Karayu.	Karayu.
Jaba.	Jaba.
Kinagasere.	Baretu wa Maji.
Kinakaliani.	Garjeda.
Meta.	Meta.
Kinagaiba.	None?
Karara.	Karara.

Uta. Their ancestor was an Oromo called Hiye, who came to the west bank of the Tana at Hola.

Ilani. A man called Gavere, tribe unknown, was found by the Uta. They befriended him and he became the ancestor of the Ilani.

Karayu. The tribe of their ancestor is not known, but his name was Mtabashi. He may have been a Boran.

Jaba. It is thought that their ancestor was a Munyo (Korokoro) from what is now Garissa district. Jaba is an Oromo word, and the Oromo call that tribe Munyo, not Korokoro. (*Note.*—So do the tribe themselves. They do not recognise the name Korokoro. The Oromo use the name Munyo for all river tribes, both Pokomo and non-Pokomo.—R.G.D.)

Kinagasere. The name of their ancestor is not known, but the Oromo call this clan Baretu wa Maji.

Kinakaliani. There are two septs of this clan. The first sept are descended from Maro Wayu, who had a son called Dulo Maro. The second sept are descended from a Kamba called Machika Mwemwere who was enslaved by the Oromo. He escaped from them and was found by Sarumbe, a descendant of Maro Wayu.

Meta. Their ancestor Komora Eba came from Oromo country.

Kinagaiba. Their ancestor Wayu Abae came from Oromo country.

Karara. Their ancestor was an Ndera called Komora Diribo. He was alive quite recently, because Malim Jilo, one of my Zubaki informants, knew him personally.

Boundaries.

The Zubaki say they used to have much trouble with the Ndura near Turo, but it has not come up since Government came. They say that long ago they fought the Malalulu, but this was not on account of a boundary dispute.

Wars with the Oromo.

After building Hola village the Zubaki circumcised some boys. One of them went to bathe in the river, and some Oromo who were there killed him outside the village. The Zubaki took counsel to repay this and killed all the Oromo who were at Hola, including their chief Gungumi. The Oromo out in the hinterland heard of this and decided that those who were killed had provoked the Zubaki. The Zubaki paid compensation and the matter was settled.

Wars with the Wata.

Formerly even the Wata defeated the Pokomo. When Wayu Umuru was chief of the Zubaki he fought the Wata with fists, and prevented them from taking food from Pokomo shambas. The Wata persisted in taking food, but went to the shambas with bows and arrows so that the Zubaki would be afraid of them. Wayu called the Zubaki together, and they made medecine so that the Wata arrows might miss them. They then followed the Wata to some banana shambas and killed almost all of them. The Wata who were left ran away to Malachini, and became guests of the Mwina. They settled at a lake called Jange, near Wema. They became the Ngatana.([10])

Wars with the Somalis.

After defeating the Oromo, the Somalis began capturing women and children. The Zubaki resisted this, and the Somalis came to the village of Kadada when Karayu Wayu was chief of the Zubaki. They fought there, and men were killed on both sides, but more Somalis were killed than Zubaki, because the Somalis had to swim the river and the Zubaki shot them with arrows in the water, till the river was red with blood. The Somalis were unable to cross.

Wars with the Kamba.

After this some Kamba came to the same village of Kadada, and wanted to enter the village. The Zubaki refused and shut the gate of the stockade round the village. Fighting began in the evening and men were killed on both sides. When the sun set the Kamba slept round the village. The Zubaki were unable to get their children out of the village to a safe place. Next day they fought from morning till evening, and the Kamba were unable to enter the village. In the evening the Kamba set fire to the stockade. A Zubaki called Goyoi shouted that the stockade was burning. The women and children rushed to the opposite side of the stockade and broke it to escape. The men tried to keep them back, but they would not obey, so the men had to follow them out where the Kamba were waiting for them.

They fought there face to face and many were killed, but the Zubaki lost the most. The Kamba captured all the women and children who ran out before the men, and took them away. The Zubaki fought very fiercely to try to recover them, but could not.

A very old man called Malim Jilo told me this. He was present himself at the fights with the Somalis and the Kamba. He was not in the fight with the Wata, but had heard of it. He is now old and blind and is the last man of his age left in Zubaki.

Malim Jilo and all the Zubaki say the first of the Upper Pokomo to reach the Tana were the Gwano and Zubaki, and that the Buu were the first of the Malachini. All other tribes came later.

The Malalulu.

The Malalulu clans are:—

Wayu Duko. Wayu Chireti. Uta. Meta. Dulo (Karara). Garjeda. Ilani.	All Hamitic names.

Wayu Duko. A man called Gatokombo reached the Tana at Malbati below Kumbi. His tribe is not known. Gatokombo was not his real name, but was given to him because he was found eating mud, which is called *tokombo* in the Malalulu dialect. He had three sons, Igu, Ibae and Kimtu. Kimtu committed an offence and his brothers drove him away. He was the ancestor of the Wayu Chireti, and the others of the Wayu Duko.

Uta. A man called Bakai Galgalo reached the Tana at Fumboni above Dafoma. His tribe was probably Boran or Oromo, but it is not certain. He had two sons Galgalo and Kofa, ancestors of the Uta.

Meta. Their ancestor Kuyo reached the Tana at Bohoni. His tribe is not known. He had two sons Bashora and Didha.

Dulo or Karara. A Boran called Dulo reached the Tana at Malbati below Harani. He had two sons Saluba and Guyo.

Garjeda. Their ancestor Ganyare came from Boran country and reached the Tana at Haretha opposite Kumbi. He had two sons Babuya and Dae.

Ilani. Their ancestors were a man called Malalulu and his brother Bashora who came to the Tana at Galomani on the border of Zubaki country. The Zubaki called them all Malalulu from the name of this man who was nearest to them. Malalulu begat Bauru, and Bashora begat Muda. Their origin is unknown, but they are thought to have been Boran, or Oromo, or Wata.

The Malalulu and their Neighbours.

Above the Malalulu live the Elwana (Malakote).[11] The Malalulu say that of old they fought the Elwana many times on account of their boundary, but not since Government came. They also fought the Zubaki once long ago, but not about the boundary. It was for some other reason.

They also say the Somalis never fought them, but did occasionally kill one or two of their people.

Author's Opinions and Explanations.

I am glad to have finished this account of all the Pokomo tribes. When Government officers encouraged me to go on with this history, I took trouble to question many old men, who know what their forefathers told them. Many were glad to help me, but some were afraid it was a trap to make the Pokomo lose their land. Thus it was not easy for me, and I got most of my information from Government Headmen. Without their help I could not have succeeded. It was especially hard to get information from the tribes who have boundary disputes with their neighbours, and those who were the last to come to the river. I had to be very cautious in questioning them. It was also hard to assess what is the truth of different stories, but by comparing them the truth can be ascertained.

Of the Malachini, I did not question the Ngatana[10] or the Mwina. The Ngatana know I am a Buu, and the Buu and Ngatana are unfriendly. When they knew that I was writing this the Ngatana reviled me, because almost all Pokomo agree that they were latecomers, and were guests of the Mwina. The Mwina are also no friends of the Buu, so I could not question them, but I questioned elders of all the other tribes. I did not write this by myself.

I will now explain tribe by tribe.

Kalindi. They claim that originally they came from Arabia to Pate, and thence to Mungini. This is like the Buu story, as they cite Singwaya and Pate. The Buu also claim to have lived at Mungini after leaving Singwaya. Evidently the Buu and Kalindi are of the same origin. Perhaps on leaving Mungini the Kalindi followed the shore and the Buu took the overland route. I have told how Sango Vere the ancestor of the Buu, came to the Tana and met Liongo at Gana. Then he went to Shaka and saw the Kalindi and found they spoke his language. Also their appearance was like his, so that Sango asked Liongo to let them go to the Tana. These two tribes must be of the same stock.

The Kalindi also say that the Ozi were their guests,[2] including Liongo. The Ozi deny this, but it is true because Liongo was a stranger, and even if not their ancestor, he was their chief. If Liongo was their chief, they must have been guests of the Kalindi, because Liongo arrived after the Kalindi.

The Kalindi do not say how they left Shaka and went to the river where they live now. As I have said each tribe is unwilling to say that it was ever the guest or slave of another. If the Kalindi admitted being taken from Shaka by the Buu, it would prove that their present land belongs to the Buu. Even the Ozi who now live at Kau, know that Sango got the Kalindi from Liongo, and took them to the river, where there was empty land. The Buu and Ozi accounts tally exactly. The Kalindi know the story, but do not want to tell it.

The Kalindi also say that when they moved to Chara, they travelled to Mahindini, below Kibusu, and that Mahindini was their boundary with the Yunda. They claim all the land from Mahindini to Shaka. From Shaka to Chara is really theirs, but a man who knows the country could not agree that they marched with the Yunda at Mahindini. At that time there were two lakes from Garsen to Ngao, Matomba (Gana) from below Garsen to near Kibusu, and Ashaka Babo from below Kibusu to Golbanti. The present river cuts between these lakes. At that time the river ran to the East, and both Buu and Kalindi lived on it till it dried up, which was not very long ago. No one could have lived at Kibusu then.

Also if you follow the old river upstream from Ngao, first you meet Buu, then Yunda, then Buu again, and then Ngatana. If the Kalindi marched with the Yunda, it must have been 70 or 80 years ago and not when the tribes first came to the Tana.

I believe that although Liongo was a stranger, he overcame the Kalindi, and can never have asked for anything from them. The Kalindi and the Buu both paid tribute till Government came.

Buu. The Buu claim to have come from Singwayu, near Kismayu. Thence they were driven by the Oromo, and came to Mungini. When they left Mungini, they went to the west to Mowa on the Magogoni river, which runs to Kau. They say they lived on that river without any Pokomo neighbours. Their neighbours were the Sanye. On the map, I have marked Mulanja and Mkoma. They say no other Pokomo could kill wild animals at Mulanja. If any did so he was beaten.

Then they moved to the Ngambwa river, and there they marched with the Mwina at Koloni. Then the Ngambwa dried up and they moved to the Mbewee, and there they marched with the Ngatana.

The Buu have been unlucky, because several times their country has been flooded, and the river has changed its course. Thus they have had to abandon their villages and move. In the land of other Pokomo tribes, the river has only changed at bends, not over a whole country. From Ngao to Mbewee is about six hours' journey on foot, but the Buu had to abandon their old villages and move to the new river. They were sorry to move and made many songs lamenting the land they loved and their big village Chikovu. Here is one of these songs:—

Pokomo.	*English.*
Mumaitha kadza ndio odu Mbuu ni mzuka, endani mukayowe kumea mani kubfaa miima, azi na mfungu za Witu nazo huziona, mudzi wehu mudzi wa mbinguni hutamisaa huichamba huyawe na manya.	If an enemy comes the Buu have bad news, go and look, the grass has grown, it has climbed the hills, we have seen the portions of Witu, our village was of the heavens, we are troubled, we did not want to be lost out in the bush.

They sing this and other songs to show their regret for their bad fortune at losing their land time after time. They still hope to be able to return to it. Their old men and women tell children about it with tears in their eyes.

The Buu did not like leaving Chikovu, but on one occasion they heard the Somalis were coming. They collected the people from all the smaller villages at Chikovu, and decided to escape. They left at about 4-00 a.m. and went westwards towards Garsen. When they reached the plain of Kokane Gobu, they turned towards Nyangoro. They looked back and saw that the Somalis had burnt their village. They were afraid and swore an oath not to run away because their women and children were with them. They put the women and children in the middle, and became a very large army. After burning the village the Somalis came after the Buu, but when they came up with them they saw a large army and thought all were men of war. So the Somalis were afraid to attack and the Buu army proceeded to Mlango wa Simba in the Nyangoro forest. They hid in the forest at Lake Tamaso. After the danger was over the chief, Buko, led the Buu to Ngao where they still live.

I pass over the other Malachini tribes because the river has not changed in their land. They live where they always lived. I go on to the Upper Pokomo, starting with the Ndera.

Ndera. Their chief clan is the Kinamaziwani. They and the Kinanato are together. The Ndera say that three Oromo came to Ndera country, and one of them, Ana Kare, was the ancestor of the Kinamaziwani. But according to the Gwano Ana Kare went to the west side of the river and begat the Migo clan of the Oromo. The Gwano say that the Ndera ancestor was Ana Abio, who begat the Kinamaziwani, and that their relatives the Kinanato are descended from Gashiro and Hadiribo, slaves of the Kinamaziwani. Personally I believe the Gwano, because I think the Ndera are pretending to have come at the same time as the Gwano. All the Pokomo know that the Ndera came later than either Gwano or Mwina. This is shown in the cult of Ngaji, because the ceremonies pass from Gwano to Ndera, which shows that the Ndera were guests of the Gwano, or received their priesthood from the Gwano.

The Gwano also say that when their ancestor went downstream there was nobody in Ndera. Even the Ndera admit that their lowest village used to be Kozi. Below that was originally Mwina. Their only other village, therefore, was Baumo. I am thus satisfied that the Ndera came later than the Gwano, and that Ana Abio was their father. I doubted the truth of what the Ndera said when they said the Kinanato and Kinamaziwani were of the same origin. After hearing the Gwano story I believe the Kinanato are descended from the slave Gashiro, but they conceal it now because this clan is now held in high esteem.

The Ndera also claim that Kimbu was their first village, but the Gwano say Kimbu was a Gwano village, before the arrival of the Ndera, and that their chief was killed by the Oromo at Kimbu. I am not sure which is the truth, because all Pokomo say the Ndera reached the Tana at Kimbu. Possibly this is true, but that the Gwano had lived there earlier.

Gwano. They say they arrived before the Ndera, Kinakomba, or Ndura. They say the Buu and Zubaki are contemporary with them. They give the same three names as the Ndera, Ana Dima, Ana Kare, and Ana Bake. I think the Ndera heard these names from the Gwano. These men reached the river in Gwano, not Ndera. Also all Pokomo agree that Ana Dima was the father of the Gwano. The other tribes agree that the Gwano came before either Kinakomba or Ndura, and that the Kinakomba preceded the Ndura.

The Gwano even now get angry very easily, which shows they used to be warlike. They were numerous till many were killed in the treacherous fight of Jilo Bune. The story of that fight is known to all Pokomo.

Also their country is not as good as that of the other Pokomo, so many have left it, and only a few remain in their home. Those who go seldom return. It is said that half the Ndera are of Gwano origin. The Gwano dialect is the easiest of all the Pokomo. Their bodies are strong and like those of the Malachini. The Ndera do not like them. They are always quarrelling about their boundary.

Kinakomba. All agree that Ali Gutu, a Boran, is the ancestor of the Mandoyo clan. This clan and the Kinambolo and the Kinamuywani are of the same stock. On the other side are the Kinamulunde, Kinambura, and Kinanguu. Their chief village is Masalani, and that of the Mandoyo is Kiaponi. From old times the lower Kinakomba used to hold the chiefship because they are of the original stock, descended from Ali Gutu. The upper Kinakomba whose main village is Masalani, used not to be chiefs or to have a house of Ngaji, though they are the more numerous.

These two divisions of the Kinakomba are unfriendly. They say they often fought, because the Masalani folk would not admit to being guests of the Mandoyo. I had to leave off questioning them, lest I start a fight. Even though the Masalani folk do not

admit to being strangers, they are not descended from Ali Gutu, and they should not be above those of Kiaponi. There is still trouble in their location on this account.

Ndura. Their main clan is the Sindo wa Ndura, descended from the Oromo Galole Hirimani. The other clans are descended from other Upper Pokomo tribes, especially the Ndera. They are not as numerous as the Kinakomba or Ndera, and their country is very small. They are said to have come later than their neighbours, and this is true because many of them are of Ndera origin. It is also said that the Kinakomba and Zubaki used to march in what is now Ndura. When the Ndura came they settled between these two tribes, and were given a portion of land from each.

The Ndura are very skilful cultivators, more so than any other Pokomo, and they have good land. Since long ago they dig the ground deep, and dig in the rubbish. Thus they have always had good crops. When the rains are due, the Ndura cultivate at night, and go back to their villages in the morning. If you go to their shambas you will see they have been planted. They do this to deceive their neighbours, as each man wants to be the first to reap. They do not trust each other, and say there is no rain or flood. Thus every year the Ndura are the first to reap.

The Ndura also say the Somalis came to the river in Ndura before Kinakomba. On the east bank in both these locations, there is much good grazing, and every year the Somalis come to them first.

Zubaki. They are mainly descended from Oromo and Kamba. Their minds are hard, unlike other Pokomo. Of old they were warlike and did not submit to their enemies. The place of their biggest fights was Kadada. Their Pokomo neighours were afraid of them, because they were fierce and many in number. They and the Buu respected each other because the Buu were the strongest of the Malachini, and the Zubaki the strongest of the Upper Pokomo.

The Zubaki also corroborated the story of the Wata who ran away and became the Ngatana.

The true Pokomo name of the Tana is Galana Maro, i.e., Maro's river. I asked all the Pokomo who gave it that name, and the Zubaki said that Maro was one of their ancestors. Possibly he was the Maro who gave his name to the river. The Gwano say that Galana is one of their names, and there are many Gwano called Galana even now. They think the river was named from a Gwano, not a Zubaki. Both these tribes claim Galana Maro to be one of their men. Others say Galana was the old Pokomo name for a river: so Galana Maro means Maro's river. The Oromo call a river Galana; the Giriama call

it Ganala. In truth the name Maro is found among those of the Zubaki ancestors, so perhaps the first Pokomo to see the river was a Zubaki.

Malalulu. The name Malalulu was the name of a man, the ancestor of a small clan, but it has been applied to the whole tribe. Their country is poor, and their crops not as good as other Pokomo, but not so bad as the Gwano land. There is not much to choose between them. Most of their cultivation is in swamps and along the edge of the river. It is not like that of other Pokomo, who cultivate where they like on both sides of the river. For this reason some of them have gone to Garissa district, and others to Kau seeking better land. Not a few remain, but if all had stayed they would be as numerous as the Zubaki. They live at the end of Kipini district, and march with the Garissa district. They get angry quickly like the Gwano, and it is surprising that they do not often quarrel with their neighbours.

The Malalulu country is long. It has much forest on both sides of the river, and much of it is uninhabited. There are many wild animals which destroy their crops, which makes it hard for them to reap a crop. They have to guard their shambas day and night from the day they plant or they will not reap anything at all.

Other Facts About the Pokomo.

It will be seen that the Pokomo are not an aboriginal people but a collection of folk who ran away from various sources and became a tribe as a result of meeting and living together. No one knows the date when the Pokomo began to be a tribe, because there was no one with the education to write when they came, but we can be sure that they first came to their country thousands of years ago. It is surprising that they met no other tribe settled on the banks of the river, so they had no trouble in settling. This shows that they are the first tribe to live in their present land.

The Pokomo are divided into the Malachini who live near the Coast, and the Upper Pokomo. Their languages are also different. The Malachini all talk one language, and the Upper Pokomo have one language also. The Malachini and Upper Pokomo can understand each other. I have no time to explain all their customs, but will set out some briefly.

Religions. The Pokomo have two cults, Ngaji and Uganga. The Ngaji is a thing made by their own hands. It is a drum, very like a honey-barrel. When they beat it its sound carries a very long way, further than a drum. Long ago no one knew what it was except the Kijo who made it. When they heard its sound, people wanted to know what it was, and the Kijo agreed to show it to them if they paid for the privilege. The Kijo took what was paid. When the agreed amount had been paid, the Kijo sent word to all Pokomo tribes naming a day. On the day

for showing it they had a day of general rejoicing. Now let us see what benefit the Ngaji brought to the Pokomo.[12] We respect the Kijo because they were like the Government of those times. Those were the times of darkness. We realise that they looked after the land. Thanks to the Kijo we found the land in good condition, because no one could cut forest, or a big tree, or damage the land without permission from the Kijo. If anyone disobeyed he was killed, so the Kijo were feared. Or the offender might have to pay a heavy fine or get some other punishment. We thank the Kijo for looking after our land. But for them we would have inherited a land which had been ruined.

The Waganga are a society of wizards who bewitch people and have communication with spirits. Those who want to become Waganga have to pay the chief Waganga. When they have paid enough they can enter the society. All who died were thought to have been killed by the Waganga, and everyone was afraid of witchcraft. Women especially had to have spirits exorcised for all ailments, even if the sickness was not caused by spirits. If the husband refused to have his wife's spirits exorcised, he was killed. On the other hand the Waganga helped people because they knew the cures for many illnesses. If people were ill they called in Waganga, who gave them medecine and cured them. They were the doctors in those days because there were no hospitals.

From old times the Pokomo knew God and worshipped him[13] with pleasant words, and prayed to him. They knew that God dislikes sin and poverty. They also knew that those who do evil would be put in a fire after death. They call the heavens Muunguni, because God lives there. It is surprising that they knew that God lives in heaven. The Pokomo could not begin to reap without setting aside a portion called God's portion. The neighbouring elders would come and eat that portion, and pray to God on behalf of the owner of the shamba. If the owner of the shamba had a son, he had to call to his father to come and eat of the produce.

Missions. The Missionaries reached Ngao in 1887. Their leader was called Wietts. At that time Buko Doyo was chief at Ngao and Kadiko Herbae was his lieutenant. The Missionaries talked to them and asked leave to build a Mission at Ngao. They had previously got a letter from the Sultan of Witu, so Buko had to agree. This was a German Mission called "The Neukirchen Mission."

Three years earlier the British Methodist Mission had come to Golbanti about an hour's walk from Ngao. They began work among the Oromo.

At about the same time the Swedish Mission came to Kulesa to preach to the Pokomo. Later these two Missions left and only the Neukirchen Mission remained. At first only children came

to the Mission at Ngao, except for one elder called Abadula Gerera. Now there are more than twenty-two churches, and the work increases.

Islam. Although the Malachini marched with the Swahilis, they did not become Mohammedans. When the Somalis reached the country of the Upper Pokomo, they killed many of them and troubled them, so that many of the Upper Pokomo moved to Malachini country. They did not get on with the Malachini, so they moved on to Chara where there was good land empty, because the Kalindi were few in number. The Upper Pokomo who settled in Chara did not want to remain savages, so they began to become Mohammedans. When Government restrained the Somalis and the land settled down, many of these Upper Pokomo went back to their country. They took Mohammedanism back with them, and Islam is increasing quicker than Christianity.

Religious Progress. As there are two divisions of Pokomo, so they are divided in religion. Most of the Malachini are Christians, and most of the Upper Pokomo Mohammedans. Only a few of them are Christians. The Christians made very slow progress in enlightenment, more so than other tribes in Kenya. This is because for many years the Missionaries did not enlighten them about the world. They only gave religious instruction. Secondly, each time the Missionaries began schools they were interned because they were Germans. Now, however, the Natives and Government have joined to encourage schools, and there are many schools where any children can be taught.

Some of the Mohammedan Pokomo can read Arabic. Some of them have been to the Riatha Mosque in Lamu. The Koran is taught in many Mohammedan villages, but they say it is unlawful to learn English writing.

The Arrival of Government. The first D.C. in Pokomo country was Mr. Anderssen. The Pokomo called him Bwana Muchinjeni. He came in 1895. It is surprising that at first he lived with the Missionaries at Ngao. This was because Ngao was the first big village with a powerful chief to welcome Government and the Missionaries. The people of Ngao were to some extent familiar with Europeans when those of other Pokomo tribes ran away and hid whenever the D.C. travelled to their country. For this reason the D.C. made many arrangements through the chief of Ngao. Ngao was the key with which the Pokomo country was opened. Later the D.C. moved to Kipini on the Coast, and it is the seat of Government now.

Present Condition of the Pokomo. Our fathers were not like the present men. Now they know each other. This is because of all the meetings held now. The Christians hold conferences every year of Christians of all Pokomo tribes. Even the Mohammedans are beginning to hold meetings. Government has started the Local Native Council, and Native Tribunals. Sometimes there

are meetings of Headmen. Thus the Pokomo begin to know, like, and help each other. In 1941, they asked the Governor to appoint one Chief over all the other Pokomo Headmen. The reason for this is because they want to be more united, thinking that if the Superior Chief be a man of intelligence, he can bind the Pokomo together through the Headmen below him.

The number of the Pokomo is increasing. There are now over 14,000 and they used to be less.

There are also Pokomo clergy as well as the European Missionaries. There are many schools, where the teachers are Pokomo, who have been examined by Government and declared fit to be teachers. The Local Native Council are considering opening a primary school and have begun to send teachers to be trained in readiness for such a school.

The Local Native Council also has money in the bank. This is shared with the Oromo. This money makes for unity, and without doubt they will continue on the road of progress like other tribes in Kenya.

NOTES BY R. G. DARROCH.

(1) *Kalindi at Hidabo.* This hill is still called Hidabo. In a very interesting article on the history of Tanaland, Mr. Talbot-Smith refers to a pre-Islam settlement at Mrio, a town at the foot of Hidabo, now buried in sand. He says the inhabitants were called Kina Inti (i.e., clan of the country) and were "of Pokomo affinities," as are some of the inhabitants of Lamu Island still (1921). Lamu he says, got its name from the Banu Lami, followers of Zeid Ali who migrated from Arabia about A.H. 39 (A.D. 661?) so the Kalindi may well have been on Lamu Island before there was a town on the present site of Lamu. In Mikael's *History of the Malachini*, I mentioned that Miss Werner derives the name Kalindi from "Dindi" meaning a hole where fish lie. Both Swahilis and Pokomo have told me that "Dindi" means the belly of a freshwater fish, and not a hole. Possibly Kalindi comes from "Kilindi" meaning deep water, *c.f.* Kilindini, or I suggest a possible derivation is the name "Kina Inti." The Pokomo have borrowed many Oromo names and corrupted them quite as much as that.

(2) *Kalindi Claim to Shaka.* The town of Shaka (known as Waungwana wa Mashaa) was founded in the days of Harun al Rashid. Local Arabs say it was in A.H. 121 (*vide* their letter sent with Mikael's *History of the Malachini*); Mr. Talbot-Smith puts it about fifty years later. The name Mashaa is derived from the title of the Shah of Persia.

Fumo Liongo did not arrive till much later. Mr. Talbot-Smith suggests, though he does not say so exactly, that his son Liongo flourished when Omar Mohammed was Sultan of Pate, A.D. 1306-1344. It is true that Liongo was a "stranger" and was chief of Waungwana wa Mashaa, but that does not say that the Ozi were guests of the Kalindi. Both Arab and Buu accounts assign a very lowly place to the Kalindi. Their claim to all land from Shaka to Semikaro is thus hard to justify.

(3) *Purchase of Land.* The story is unlikely as the Kalindi seem to have been subjects of Liongo and later Sango. It is, however, interesting as bearing on Pokomo land tenure. So far as I can make out cultivated land is regarded as belonging to a family, the individual occupier being merely a tenant for life. Sale is thus impossible. Normally

the sons of a landholder succeed their father. If a landholder dies childless, the claims of his nearest of kin are decided by the head of the "mlango." If virgin forest be cleared the land becomes part of the family holding of the man who cleared it.

(4) *Chara Headmen.* Mikael may be right about the issue of official staves, but Kalindi Headmen were recognised from the first days of British rule. A list compiled in 1900 by Mr. Anderssen, the first District Commissioner, shows two Kalindi, Kiriole at Meli, between Anasa and Semikaro, and Rangi at Bura (Golbanti: Bura is really the Pokomo village, and Golbanti the Oromo name for a place very adjacent, but Golbanti is so much better known that it is better to stick to it). There was also an Ndera Headman called Kombo Mitambo at what is now called Belezoni (Mbelezo is the Pokomo for a canal) where the present Tana leaves the old Tana, or Sheriko, in charge of the Upper Pokomo settled in Chara. There were estimated to be about 1,000 of them, more Ndera than any other tribe, in 1900. The present Headman of Chara, Abdalla Bashors, is also an Ndera.

(5) *Pokomo Clan Names.* As will be seen most Upper Pokomo clans have both a Bantu and a Hamitic name, except the Malalulu whose clans have only Hamitic names, and the Zubaki, only three of whose clans have Bantu names. The most interesting name is "Karayu" the name of the Boran Royal Clan, to which their big chief Gedu in Ethiopia belonged. Curiously every tribe which has this name says its forefather was an Oromo and not a Boran, except the Zubaki. The Boran and Oromo are, of course, closely related.
Mikael's list differs considerably from one compiled by Miss Werner in 1913, but it would be tedious to tabulate them.

(6) *Gwano and Ndera Ancestors.* The Ndera gave me the same account as the Gwano gave Mikael, i.e., that Ana Dima was the first Pokomo, Ana Bake (some said Ana Duri) stayed on the east side where the Somalis are now, and Ana Kare crossed to the west. The Gwano, however, told me that Ana Bake was the first Pokomo, and Ana Dima went back to the east. It shows how such traditions get confused. Mikael had far more time to give to the subject than I, and questioned more elders, so his final version is likely to be the better. He admitted to me that his informants were not unanimous on such points.
The Gwano version is almost certainly the true one: the Ndera have copied it to conceal slave origin.
The Gwano also told me that when Ana Dima and Ana Bake separated, they arranged that the Pokomo should clear watering places for Oromo stock, and receive an ox each season for leave to water. Also that when the Oromo lived on both banks, the Pokomo got one or two oxen every time they ferried stock across, but that the Pokomo were not allowed to do the actual slaughtering if an Oromo were there. The Oromo slaughtered the ox, and then the Pokomo cut it up and ate it. This applied also if the Pokomo were given a present of meat at an Oromo village.

(7) *Fight with Arabs.* Arabs and Swahilis agree that no tribute was ever levied on Upper Pokomo. The Arab leader was called Mwenye Era. The Gwano say that when Europeans came some of the Upper Pokomo wanted to resist, and called on the Gwano to lead them, as the senior tribe. The Gwano said they had taken the lead against Arabs and Somalis [see Note (9)] and it was the turn of someone else now, so there was no opposition.

(8) *Meeting of Ana and Sango.* The Gwano told me that Ana met not Sango, but his father Vere, and that they met not at Lake Lemu, but at Mitole, which is near where the motor road crosses the river Ngambwa. This is probably the second meeting described by Mikael, i.e., the Buu remember two meetings, and the Gwano only one. Otherwise the story I heard from the Gwano is the same as Mikael's.

(9) *War of Jilo Bune.* Jilo Bune was the Oromo chief. The Gwano told me their chief was called Kokane Didha: Mikael told me his name was Dadho Moroa. His is probably correct, as Kokane Didha appears as ancestor of the Kinadyasi. The story, as I heard it, was the same as Mikael's except that they said one Herbae Gafo went with his brother, and hid and saw the Oromo kill his brother. He then went and told the Gwano chief, who declared war on the Oromo, which continued till the Somalis came and defeated the Oromo, many of whom were killed by Pokomo while escaping across the river. The Oromo then made peace with the Pokomo.

The Oromo were then defeated again near Kiaponi, and asked the Pokomo to help to recover the cattle taken by the Somalis. A meeting of all Upper Pokomo tribes was called and they agreed to do so. The Gwano and Zubaki formed the vanguard, as the two senior tribes, and the Malalulu were in the rear, as the junior tribe. The Pokomo and Oromo recovered the cattle and took them back to Kiaponi. The Oromo wanted to take the cattle away at once, but the Pokomo refused and feasted that night. Kiaponi village was then on the right bank: it was only moved to its present site a few years ago. In the morning the Somalis attacked, and the Pokomo shot them with arrows, and prevented them from crossing the river to close quarters, till some of the Somalis went up to Masalani and crossed there. Two Pokomo were killed, and the rest seeing themselves in danger of being surrounded, ran for it, but the cattle were by this time in safety. Somali losses are said to have been much heavier than those of the Pokomo. An old man called Chalalu Herbae, who died three years ago, is said to have attended the meeting, as a small boy, but to have been too young to go to the fight.

(10) *Origin of Ngatana and Mwina.* The Mwina are also of Wata origin. The Zubaki story about the Ngatana corroborates the Buu one given by Mikael in his *History of the Malachini.* As I mentioned there, the Ngatana have a tradition of coming from Shungwaya, like the Buu, and Mikael admits that he did not question the Ngatana. The explanation may be that the Ngatana spring from two sources, or that they have invented the story of Kanjala Dima coming about the same time as Sango Vere. The latter is perhaps the more probable since Zubaki and Gwano stories corroborate the Buu account in material particulars. The Gwano told me that when Ana met Vere, they divided the country at Hombe, between Baumo and Kozi, i.e., there cannot have been anyone in Mwina or Ngatana country then. Then came the Mwina, who were given the land from Hombe to Koloni. Last of all came the Ngatana.

(11) *The Elwana.* These people do not recognise the name Malakote which is usually applied to them. They are not Pokomo, though often classed as such. They reached their present habitation after the Malalulu, the junior Pokomo tribe, were settled. Their traditions and customs are different to those of the Pokomo, in fact they use the name Pokomo when speaking of Malalulu, etc., to distinguish them from themselves. For one thing they circumcise women, which none of the Pokomo do. The Malalulu told me that the Elwana arrived in the lifetime of Igu, son of Gatokombo. The Malalulu began to circumcise girls, copying the Elwana, but several died so they abandoned the practice. As a rough guide to chronology the genealogy given me by the present Malalulu chief, Mukaraji Maro, may be of interest: Gatokombo (Maro)—Igu—Maro—Dadho—Maro, father of Mukaraji.

(12) *The Kijo.* It is refreshing to find a Christian Pokomo so obviously out to admire as much as he can of the old customs. Very different is the attitude of many of the younger Mohammedans, who condemn any old custom, simply because it is old. For instance, the Pokomo

have an excellent rule that a man may not send his wife to cultivate during the seventh and subsequent months of pregnancy. This, some Mohammedans say, does not bind them on "religious" grounds. As Mikael says later, they are also trying to prevent the spread of education, on the same pretext.

Admitting the good the Kijo did as guardians of the soil, there is another side to the picture. Not only did they exact heavy initiation fees, but also levied contributions of food and other things from non-Kijo, without payment. They were not only priests, but judiciary, legislature, and executive combined as well. According to Mr. Anderssen, they were extremely corrupt in all these capacities.

Thanks to the spread of Christianity and Islam, the cult has now declined, and to all intents only old men still adhere to it. Kinakomba and Zubaki are its main strongholds today, but many of the older Mohammedans keep Kijo celebrations.

([13]) *Belief in God.* Mr. Anderssen writes: "They worship and sacrifice to God as the Creator (colloquially called 'the old man of the woods') and to the spirits of deceased relatives." Ancestor worship is, I believe, common to almost all Bantu.

OCCASIONAL NOTES.

The following note, given verbally by Capt. Oulton of the Game Department, should be of interest to readers: "When coming back from control work on Wednesday, August 25th, in the Dagoretti district, I saw a large bird of the eagle family in a tree. The natives accompanying me begged me to shoot it as it took away and ate their young sheep and goats. During the discussion the bird flew away to another tree (the distance between each tree being 300 yards approximately) when I saw it was carrying some object which the boys said was a hare. I followed the bird up and shot it. I then found the eagle was carrying a young dik-dik. It had eaten the stomach and parts of the head. I should estimate the carcase as carried by the bird from tree to tree as five pounds in weight."

The eagle was brought back by Capt. Oulton and presented to the Coryndon Museum. It proved to be a young, not yet full-grown, Tawny Eagle (*Aquila rapax rapax*).

H.C.

FRIGATE BIRD NEAR MALINDI. I saw a number of Frigate Birds, assumed to be *Fregata minor aldabrensis* Math., harassing Boobies [? *Sula dactylatra melanops* (Heugl.)] off Watamu during June and July, 1939. This confirms Jackson's sight record, also made off Malindi. (Jackson, Vol. I, p. 26.)

H. F. STONEHAM,

Stoneham Museum, Kitale.

LATE DATE FOR EUROPEAN STORKS. During July, 1943, I saw many Storks, *Ciconia ciconia* (L.), near Kakamega Boma.

H. F. STONEHAM.

STEPPE EAGLE IN TRANS-NZOIA. On several occasions a Western Steppe Eagle (*Aquila nipalensis orientalis* Cab.) was closely observed in different localities in Eastern Trans-Nzoia during the dry season of 1942-43. It was larger and darker in appearance than the Tawny Eagle, and preyed on Guinea Fowl.

H. F. STONEHAM.

FIRST KENYA RECORD OF TEMMINCK'S STINT. I shot a Temminck's Stint, *Calidris temminckii* (Leisl.), at Lake Naivasha, in September, 1939.

H. F. STONEHAM.

HEUGLIN'S WEAVER. Jackson (Vol. I, p. 1414) states that Heuglin's Weaver (*Sitagra heuglini* Reich.) is only known in Kenya from the Kerio River, but in fact, it is common in Trans-Nzoia, and breeds in colonies in my garden, eight miles from Kitale. The Gabar Goshawk, *Melierax gabar* (Daud.) tears out the bottoms of nests and takes the young. This year Swainson's Bronze Mannikins (*Spermestes cucullatus scutatus* Heugl.) occupied one nest after the Weavers had left it; the nest was blown down while the young Mannikins were still in it, but I placed it in a bush and the parents continued to feed them there till they flew a week later.

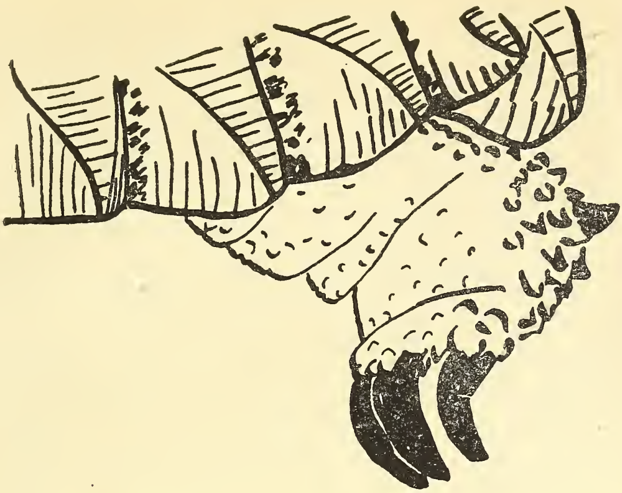
H. F. STONEHAM.

SOME NOTES ON THE BREEDING HABITS OF THE LEOPARD TORTOISE (*TESTUDO PARDALIS* BELL). We have three tortoises, pets in every sense of the word. They vary in taste and temperament. One is a male weighing 18 lbs., the other two are females weighing 41 and 37 ibs., the latter has more than doubled her weight in two and a half years. They all have gigantic appetites, and it is not uncommon for one of them, to eat an entire hard white cabbage at a sitting, they will also eat large quantities of sweet potato tops, of which they are all very fond, as well as all the usual rabbit foods.

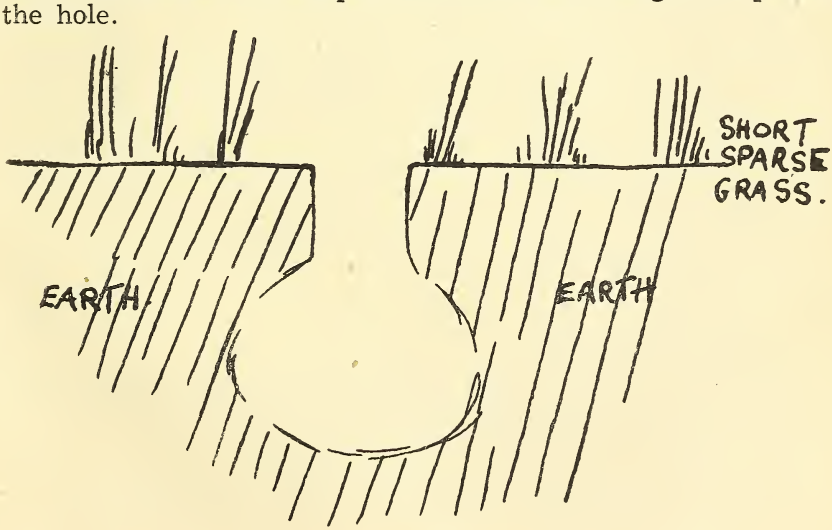
The mating of these tortoises is a curious affair. The male starts walking just behind the female, and this walk may go on for several hours before he is given an opportunity to mount. Then he stretches out his long neck and makes a husky cry which may be heard from quite a distance. This is a common occurrence, but it was not until three months ago that we found our first nestful of eggs. The dog found it, she scratched in the ground and dug up three eggs, and ate them before we got there, then we found twenty-seven more!

The eggs are round and white and look very like ping-pong balls, but actually they are slightly larger. The shell is a little thicker than a hen's egg shell, and when we broke one egg open, it had the usual yolk and white.

We were now on the alert. A few days later the other female was seen to be digging. First she stood on three legs, and with the free back leg she scraped a hole tossing the loose earth to one side. The sketch below of her hind leg illustrates her long curved nails, ideal for digging.



Then she transfers her weight to her other back leg and scoops with the free one. This went on steadily for some time, tread on one foot scrape with the other, then tread on the other and scrape with the first one. After a while she struck a hard stone and decided to give it up and she moved along to a new site. Then without once looking she started all over again, and this time dug a beautiful flask shaped cavity about twelve inches deep. It was a work of art, and most interesting to see her put her leg down the neck of the hole and scoop out the loose earth which she had scraped out from the underground part of the hole.



In this hole she laid her eggs, they were packed quite tightly as if they were in an egg box. I did not actually count them, but imagine that there were about thirty again, then she filled up the hole with loose earth still using her back legs, alternately as before, until the hole was quite full again, and flush with the surface and then she walked away. Her maternal duties were over. The whole affair, including the false start, took an hour and a half.

The eggs have not hatched so far, we do not know what the incubation period is, but the eggs are still fresh so we are hopeful. We cannot help wondering why the two tortoises both decided to lay at the beginning of the cold misty season, whether it is because it will be nice warm weather when the baby tortoises hatch out, and if so what about the cold wet weather for the incubation period? Perhaps she knows nothing of the weather being out of her natural environment in Nyeri. At all events they are grand pets and have given us plenty to think about. I hope that we may have about sixty of them in the near future.

B. LEAKEY,
Nyeri.

ON THE SEPARATION OF THE SEXES IN MAMMALS DURING DROUGHT. A cattle-breeder knows how important it is to vary the blood of his stock to keep it strong and healthy.

In nature, wild animals let us see how the same thing happens. Impalla, Lesser and very probably Greater Kudu, Sable Antelope and often Eland leave their females alone after the season of reproduction. The lion abandons the lioness after a while to hunt in the company of other males. During some months the Boar, or Wart Hog is seen alone.

We can imagine that later these animals will have new families with unknown females, but we wonder what measures the species that we always meet in herds take to avoid inbreeding. Does separation take place during the drought, when the big herds of the plains are broken up to travel to the highlands still favoured by the rains, or during the fights of the males in the rutting season? It is at this time that the old males are turned away from their herds. As cruel as it appears, this measure is wise in such polygamous societies, for, as a well-known Swiss biologist, whose name, I fear, I have forgotten, says:—

> "The young, born of old bulls, are very much more often males than females."

It would be interesting to receive observations on this matter to settle an interesting point in the life of our big game.

This *Journal* will undoubtedly publish them.

GUY BABAULT,
Associé du Museum National de Paris,
Ex Vice-Pt., de la Ste. Mammologique, Nairobi.

NESTING HABITS OF RED-THROATED ROCK-MARTIN (*PTYONOPROGNE R. RUFIGULA*). The situation of the nest was on the keystone of an arch of the verandah, about 13½ feet from the ground. The nest itself was small and cup shaped, made of two different kinds of mud, with small twigs and fibre stuck into it, in the inside. On this there was first a layer of small feathers, and then a quantity of very soft down.

The eggs, two in number, were nestling in two hollows in the down, their colour was white, with sepia blotches, chiefly at the larger end. Both eggs measured 20.5 x 14.75 mm. The eggs were laid on either the 29th, 30th or 31st May, 1943.

We have had Rock-Martins breeding and nesting on this verandah for over fourteen years.

ARLAND USSHER,
Pembroke House, Gilgil.

CORRIGENDUM ET ADDENDUM.

The Editor regrets that owing to the unexpected delay that occurred between the correction of the final proofs and the publication of the last number of the *Journal*, the publication date was given as December, 1943, when in actual fact the number was received from the printers in February, 1944.

J.R.H.

It is regretted that no acknowledgment was made to the Government Grants Committee of the Royal Society, in the paper dealing with East African Miocene Primates which appeared in the last number of this *Journal* (**17**, 141-181).

Much of the material on which the paper was based was collected by members of Dr. Leakey's 1932 and 1935 expeditions, both of which were partially financed by Royal Society Government Grants; owing to an oversight, however, no acknowledgment was made in the paper.

We should like to express our gratitude to the Royal Society for the financial support which made the expeditions possible.

L. S. B. LEAKEY.
D. G. MACINNES.

OBITUARY.

THE LATE REAR-ADMIRAL LYNES, C.B. Admiral Lynes, the authority on that difficult group of birds, the Cisticolae (Grass-warblers), died in England on November 10th, 1942. He visited Kenya in 1937, when he rendered much assistance to the Coryndon Museum in both field and laboratory work and made a handsome donation towards the cost of one of the habitat groups in the Exhibition Hall. Many of our members had the privilege of his personal friendship.

THE LATE SIR EDWARD POULTON, F.R.S. Sir Edward Poulton,a life-member of the Society died on November 20th, 1943, at the age of 87. A staunch exponent of Darwinism, he was Hope Professor of Zoology at Oxford from 1893-1933. His main interest lay in the coloration of animals and, in particular, mimicry. An article from his pen, on *Papilio dardanus,* appeared in this *Journal* (No. 20, 4).

THE LATE A. J. KLEIN. A. J. Klein was a member of the Society from 1910 until the time of his death. Trained as a taxidermist, he came to the Colony and for many years followed the profession of a White Hunter. In this capacity he collected extensively for the American Museum of Natural History, New York, as well as conducting many safari for wealthy Americans. Soon after the outbreak of war he undertook the collection of shark livers for their oil and at the time of his death was intimately associated with the Government Fishing Station at Shimoni.

The deaths of three other well-known naturalists are reported. Professor Einar Lönnberg, who died on October 21st, 1942, was the author of many papers on African vertebrates. Mr. H. F. Witherby, M.B.E., ornithologist and member of the well-known publishing firm of works on Natural History, H. F. & G. Witherby, died on December 11th, 1943. The death of Sir David Prain, director of the Royal Botanic Gardens, Kew, occurred on March 16th, 1944.

THE THIRTY-THIRD ANNUAL REPORT OF THE EAST AFRICA NATURAL HISTORY SOCIETY FOR THE YEAR 1943.

1. *Officers.*—The following members of the Society constituted the Executive Committee for the year in question:—

R. DAUBNEY, Esq., President and Chairman.
H. J. ALLEN-TURNER, Esq., Vice-President.
Miss K. E. ATTWOOD, Hon. Treasurer.
J. R. HUDSON, Esq., Hon. Editor of the *Journal*.
HUGH COPLEY, Hon. Secretary.

Sir CHARLES BELCHER.
Dr. L. S. B. LEAKEY.
Dr. J. C. CAROTHERS.
F. B. HANNAM, Esq.
Dr. D. G. MACINNES.

There were eleven meetings of the Executive Committee during the year.

2. *Obituary.*—During the year the Society lost one of its very oldest members in Canon K. St. Aubyn Rogers who joined the Society two years after its inception and remained a member up to his death. Canon Rogers served on the Executive Committee for many years and will be long remembered for his work on the butterflies of the Colony. His loss was a sad blow to the Society.

During the year we have to record the death of Rear Admiral H. Lynes, C.B., R.N., who was deeply interested in the birds of East Africa. Admiral Lynes, from time to time, made donations to the Society which were utilised to purchase cabinets. His prewar visits to the Colony to see his beloved birds will be greatly missed by all who came in contact with him.

The Society has also to record the death of one of its past Presidents, Mr. A. L. Sikes, who served on the Executive Committee for many years and who considerably helped the geological collection of the Museum.

Another past officer of the Society also passed away during the year. Mr. J. K. Ramsden was Hon. Treasurer of the Society for some time and gave valuable help during his period of service in this Colony.

3. *Membership and Subscriptions.*—During the year seventy new ordinary members and five life members joined the Society whilst two institutes also joined. These figures are most gratifying. We feel the large numbers of members joining is, in part, linked with the added attractions of the Museum which bring visitors into contact with the activities of the Society. Two members resigned during the year. From the membership side the Society is in a strong position, for in the last two years the membership has been increased by one hundred and thirty-six new members. As promised a list of the names of the members was published in the *Journal* during the year.

4. *Finance.*—The Hon. Treasurer has prepared and the Executive Committee passed the financial statement for the year. This statement will be presented in due course.

The members are truly grateful to the Museum Board of Trustees for their donation of Shs. 1,000/- towards the costs of printing articles by the Museum staff.

It is a pleasure to refer to the amicable relations existing between the Society and the Board of Trustees.

5. With the help of the Trustees and the most valuable co-operation of the members of the Museum staff the third Conversazione was held

in October last. A report of the exhibits will appear in the *Journal* in the near future.

6. *Library, Journal and Publications.*—During the year in question Mrs. Copley acted as Hon. Librarian to the Society which means not only keeping the library in order but doing a lot of the typing necessary to keep the Society in being. This work is getting greater every year as some of the enquiries received take a lot of research before they can be answered. Enquiries are received on most extraordinary and unusual subjects, quite a number have direct reference to war work. Sometimes one wishes our members were not so inquisitive.

The catalogue of library books made last year has been most useful as we get enquiries from all Territories for scientific literature.

During the year the Hon. Librarian prepared an index of all the numbers of the *Journal* of the Society which we hope to publish as soon as possible.

Mr. Hudson acted as Honorary Editor to the *Journal* during the past year. Only the one number of the *Journal* was printed and issued in 1943. A second number of the *Journal* was prepared and handed in for printing the middle of June with confident hopes it would be in the hands of our members about August and another number out by last Christmas. This did not materialise and up to the closing period of the report no delivery could be obtained from our printers of the second *Journal*, but we cannot overcome printing and publishing troubles.

The Executive Committee has for a long time been keen on producing a handbook on the birds of Kenya and has for some time been exploring possibilities. A step further has been taken and a small sub-committee is at work in this matter, yet I would warn members of the Society that things are difficult these days.

The sale of brochures, reprints, etc., was again well-maintained and some have gone out of print until the war is over.

In this matter the help of Mr. Richards of the C.M.S. is greatly appreciated.

Through the great assistance of Mr. Richards of the C.M.S. the Society was able to purchase the scientific library of the late Canon Rogers.

The Society was also able to purchase by means of an anonymous gift a full edition of the Encyclopedia Britannica. A number of scientific text-books were also ordered during the year and these are now slowly coming to hand.

7. The Interim Report of the Game Policy Committee was discussed by the Committee and approved. The following resolution was passed and submitted to Government: "This Executive Committee of the East Africa Natural History Society is in agreement with all the recommendations made in the Interim Report of the Game Policy Committee. The Committee believes the time has come when game preservation in the settled areas can no longer be upheld, and there is an immediate and pressing need for a revision of the existing game laws to enable game to be removed from the farming areas. The first step is that the Chief National Park for Kenya should be demarcated and the Ordinance should provide for the setting aside of areas as National Parks in accordance with Article 2 of the International Convention for the Protection of Fauna and Flora, 1933."

8. Apart from the trouble experienced in printing the *Journal*, the year 1943 has been one of continued progress and our thanks are due to all our members for sustained support in difficult times.

EAST AFRICA NATURAL HISTORY SOCIETY COMPARATIVE CASH STATEMENTS, 1942—1943

	1942. Shs. cts.	1943. Shs. cts.
To Balances—		
Anthropological Fund ...	1,000 00	1,000 00
Post Office Savings ...	265 93	265 93
Bank	2,464 30	4,301 85
,, Museums Trustees	2,000 00	2,000 00
,, Subscriptions	5,189 00	6,910 00
,, Sales of Reprints	1,459 20	1,350 40
,, Donations (Miscellaneous) ...	— —	121 75
,, Donation to publishing of Journal (Museums Trustees)	1,000 00	1,000 00
,, Conversazione	349 30	454 70
,, Miscellaneous	6 00	134 70
Shs.	13,733 73	17,539 33

	1942. Shs. cts.	1943. Shs. cts.
By Museums Trustees	1,000 00	1,000 00
,, Subscriptions to Institutes ...	251 50	142 50
,, Publishing Journal	5,790 50	3,515 00
,, Postage	443 60	440 20
,, Miscellaneous Items	280 25	973 35
,, Refund of Subscriptions ...	201 00	— —
,, Purchase of Books for Library	— —	649 40
,, Balances carried forward—		
Anthropological Fund ...	1,000 00	1,000 00
Post Office Savings Account	265 93	297 13
Bank	4,301 85	9,422 05*
Reconciliation Account ...	19 10	— —
Cash in hand	— —	89 70
Shs.	13,733 73	17,539 33

	Shs. cts.
*Cash Balance at Bank	9,422 05
Less: Reserve for Journal prepared for issue 1943, but not published till 1944 ...	5,062 00
Net Balance: Shs.	4,360 05

NOTES:

Journal: Two numbers were published and issued in 1942. One number only was issued in 1943; a second though prepared, was not published until 1944.

Miscellaneous Items: Increase in expenditure due to replenishment of stationery stocks, membership cards, increased advertising of Society's activities, and certain items brought forward from 1942.

(Sd.) K. E. ATTWOOD,
Hon. Treasurer,
East Africa Natural History Society.

NAIROBI.

SUMMARY OF REPORT ON THE CORYNDON MUSEUM FOR THE PERIOD 1st JULY TO 31st DECEMBER, 1943.

By the Hon. Curator.

The promise of a record year, which was held out by the results of the first six months as reported in the last issue of the *Journal*, was fulfilled.

Exhibition Hall.—Fresh exhibits were placed on view, including miniature tableau groups of rhinoceros and okapi, presented by Major Campbell, numerous birds, many fish casts and a number of small mammals.

Research.—Scientific research in archaeology, botany, palaeontology and zoology was continued and several papers published and prepared for publication.

Cataloguing.—The classifying, cataloguing and card-indexing of the bird collection was completed, and that of the mammal collection started. The conchology and fish collections were also catalogued.

Visitors.—A new record for the year was set up. The figure for the second six months was 26,649, bringing the total for the year to 46,988 (32,635 adults and 14,353 children). The door receipts for the second-half of the year were £397-18-70, bringing the total for the year to £746-2-80.

L. S. B. Leakey.

THE EAST AFRICA NATURAL HISTORY SOCIETY

PUBLICATIONS OF THE SOCIETY

Copies of most of the back-numbers of the *Journal* can be supplied at prices varying from Shs. 2/- to Shs. 20/- per copy. Members of the Society are entitled to 20% discount. Reprints of many of the articles that have appeared in the Journal are also available. A list was given on the back cover of the last issue and this will appear again in the next.

Special attention is drawn to the

BUTTERFLIES OF KENYA AND UGANDA
by Dr. V. G. L. van Someren and his collaborators.

The following parts are available and copies may be obtained from the Hon. Secretary at a cost of Shs. 5/- per part:—

Vol. I. Parts 1-10 and Supplement.
Vol. II. Parts 1 and 2.

A similar work is the

BIRDS OF KENYA AND UGANDA
by Dr. V. G. L. van Someren.

Of this copies of the following may still be obtained:—

Vol. I. Parts 1, 2, 4, 5, 6, 7 and 9.
Vol. II. Parts 1 to 5.

The Society has also issued a series of brochures with the intention of enabling those with no scientific knowledge of the subject to identify the different members of various groups of animals or plants in which they may happen to be interested. These brochures may be obtained at the uniform price of Shs. 3/- per copy from

THE CORYNDON MEMORIAL MUSEUM,
NAIROBI.

MESSRS. MOORE'S BOOKSHOP,
GOVERNMENT ROAD, NAIROBI.

MESSRS. THE EAST AFRICAN STANDARD LTD.,
DELAMERE AVENUE, NAIROBI.

or by post from

THE HONORARY SECRETARY,
THE EAST AFRICA NATURAL HISTORY SOCIETY,
P.O. Box 241, NAIROBI.

The following have been issued:—

A SHORT ACCOUNT OF THE FRESHWATER FISHES OF KENYA
by Hugh Copley.

A FIELD GUIDE TO THE SCAVENGING BIRDS OF KENYA
by M. E. W. North.

EAST AFRICAN STAPELIEAE
by P. R. O. Bally.

AN INTRODUCTION TO THE EPIPHYTIC ORCHIDS OF EAST AFRICA
by W. M. and R. E. Moreau.

SOME COMMON BUTTERFLIES OF THE NAIROBI DISTRICT
by A. J. Wiley and J. R. Hudson.